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THE LANCET

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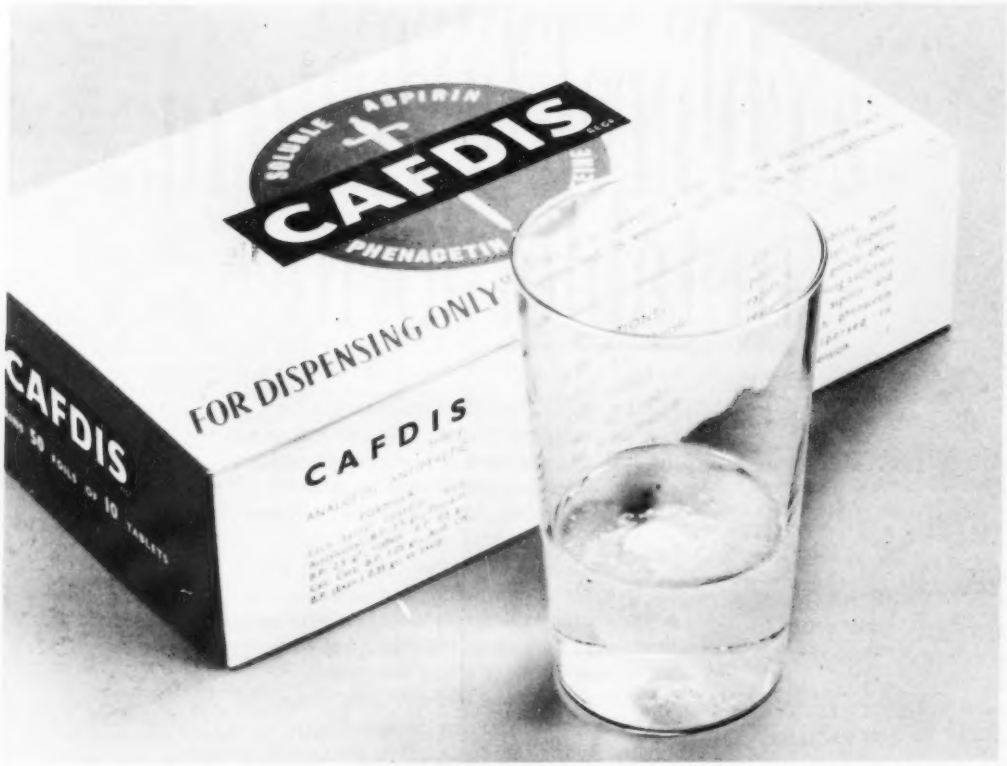

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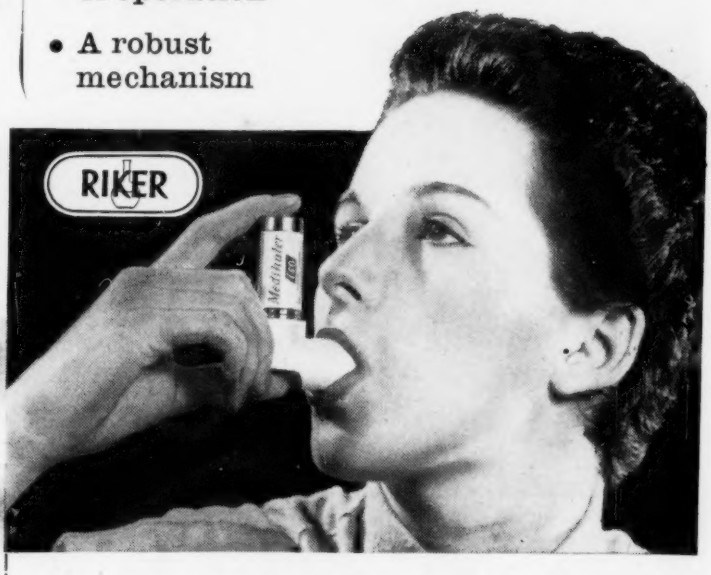

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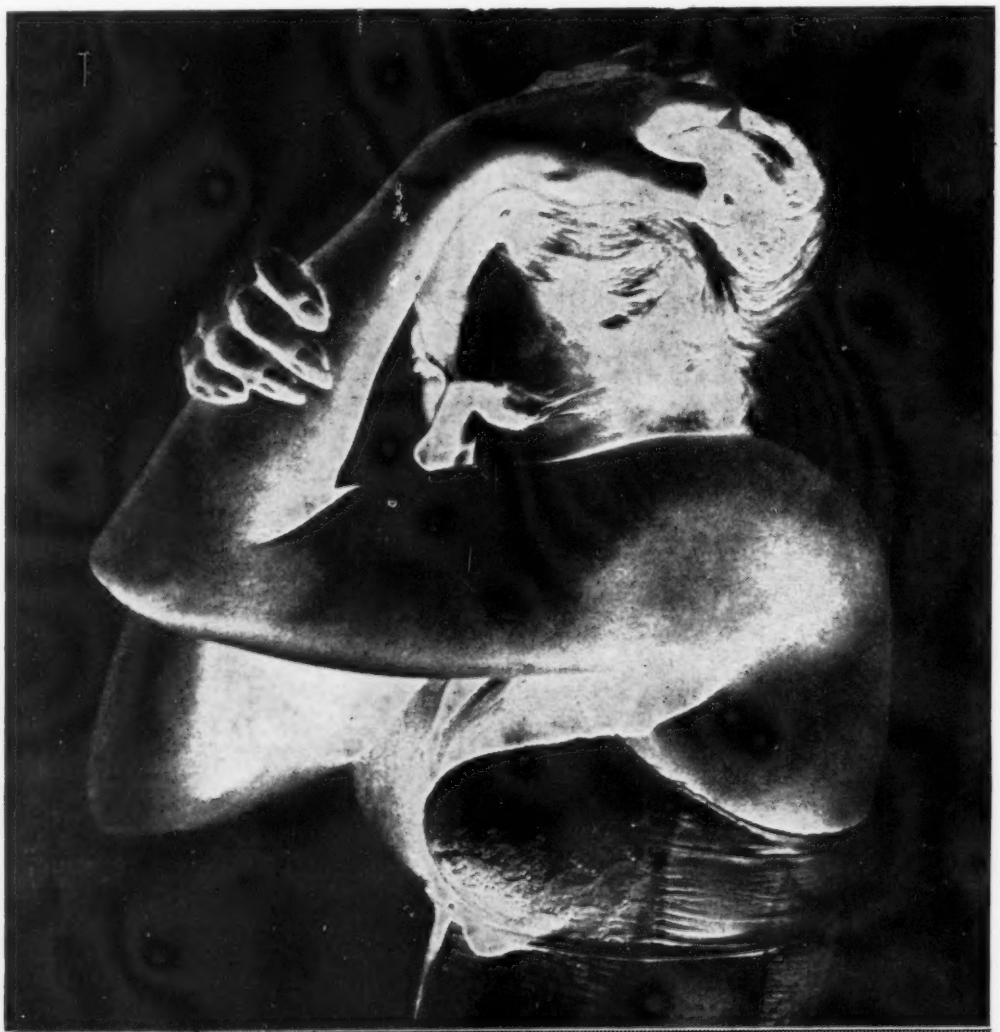

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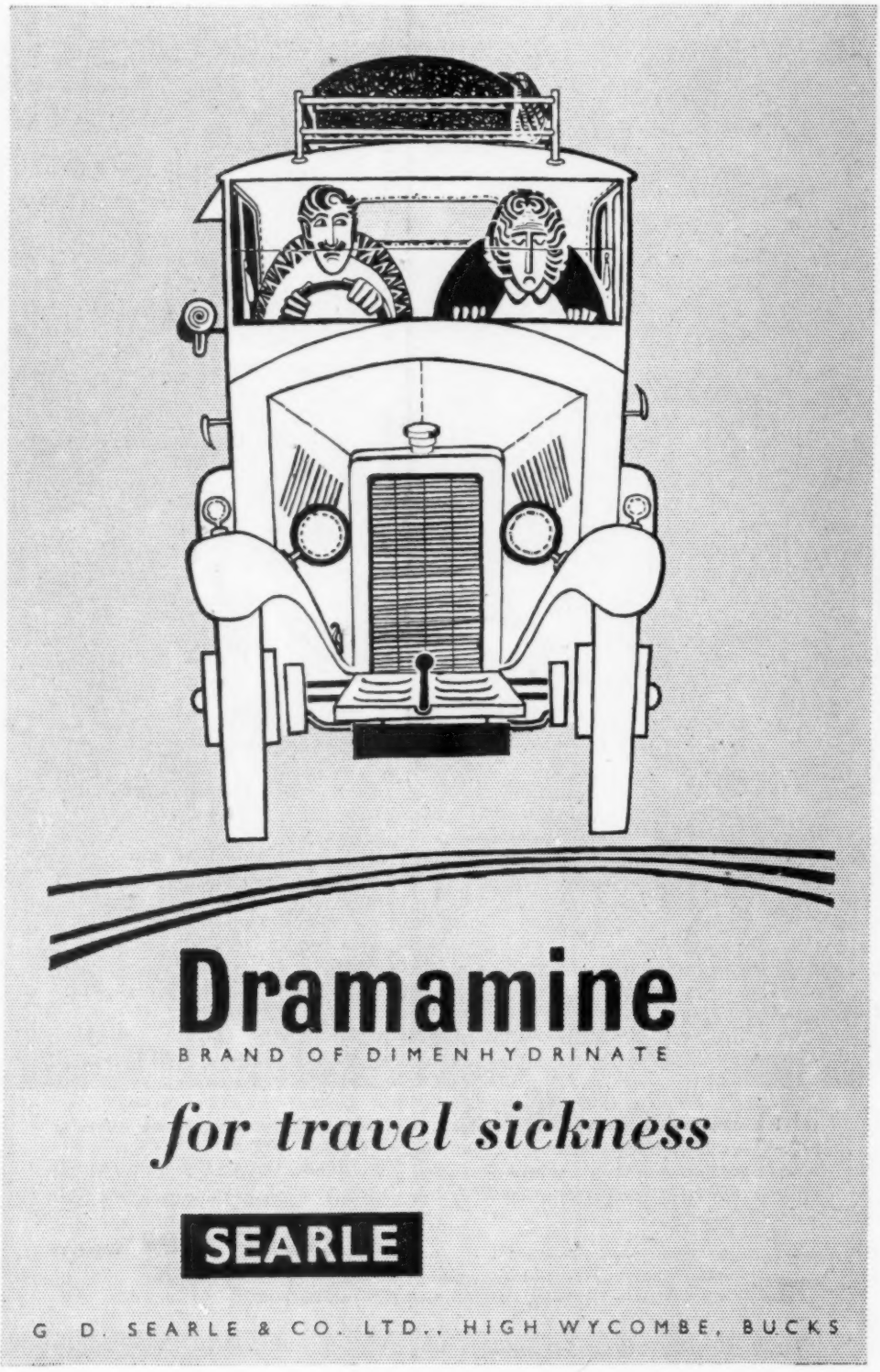
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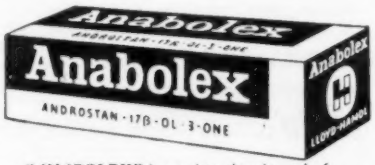
INDICATIONS:

Middle-aged or elderly people who are debilitated or "run down."

Preparation for and recovery from planned surgery. Convalescent patients. Premature infants. The child or adolescent who is under weight. Anorexia. Asthenia. Malnutrition. Wasting diseases.

PRESENTATION: In vials of 25 and 100 tablets, each tablet containing 25 mg. Androstanolone. Anabolex can be prescribed on Form E.C. 10. Basic N.H.S. price 20/- and 70/-.



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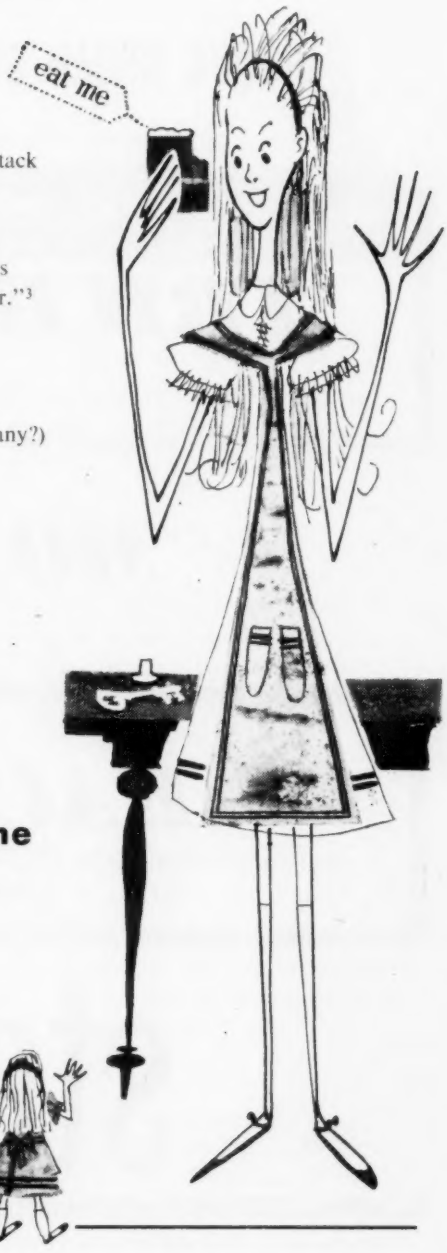
Migraine in Wonderland

The fantasies of altered body size and shape in *Alice in Wonderland* are like those experienced by some migraine patients.[1] Disorders of body image may be found in migraine either as an aura to an attack or as a migrainous equivalent.[2]

Lewis Carroll himself suffered from migraine,[1] and it may well be that "Alice trod the paths and byways of a Wonderland well known to her creator."[3] If that is so, English literature is the richer for Mr. Carroll's migraine.[2]

Curiouser and curiouser . . .
to picture Alice's adventures (would she have had any?)
if Cafergot had been at hand
for Lewis Carroll's migraine . . .

[1] *J. nerv. ment. Dis.* (1952) **116**, 346 [2] *Lancet* (1956) **1**, 794
[3] *Canad. med. Ass. J.* (1955) **73**, 701



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EACH TABLET CONTAINS	2 mg. of (1-methyl 2-pyrrolidyl) methyl benzilate methyl methosulphate

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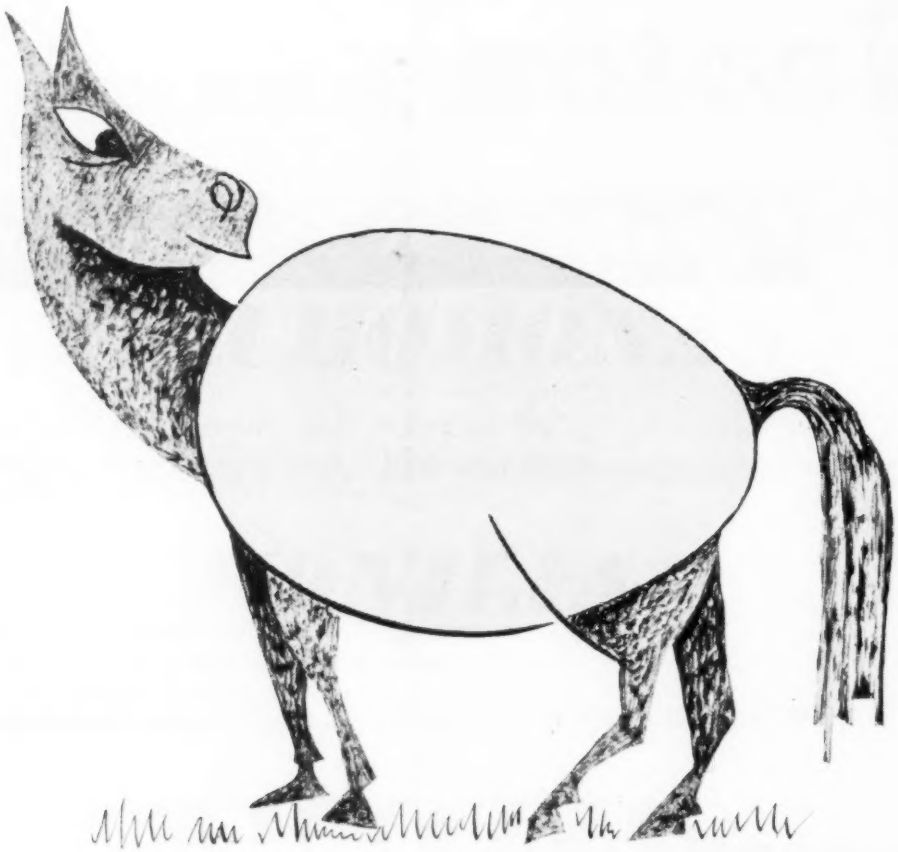

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Mild depression (and for appetite control)	dexamphetamine resinate ≡ 10 mg. dexamphet. sulph.	½-1 tablet at breakfast-time. 30 tablets 2/6.	**dexten***
Depression with anxiety	dexamphetamine resinate ≡ 10 mg. dexamphet. sulph. phenobarbitone . . . . . 65 mg. (1 gr.)	½-1 tablet at breakfast-time. 30 tablets 3/10.	**barbidex***

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1 tablet daily instead of 8

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This might have been prevented but . . .

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NEARLY EVERY PHYSICIAN prescribing a tonic today thinks first in terms of either iron or vitamins. Or both; because the efficacy of iron depends so much on the vitamins linked with its absorption.

Foremost of these are ascorbic acid and the factors of the vitamin B complex.

All these are presented with easily assimilable ferrous iron in a single tablet of Ferraplex B.

Ferraplex B tablets are easily swallowed and well tolerated. They provide a complete iron haematinic therapy for convalescents, adolescents, pregnant women and patients with all degrees of iron deficiency anaemia.

COMPOSITION

Average daily dose of six FERRAPLEX B *tablets contains:*

Ferri Sulph. Exsicc., B.P.	1 gramme
Copper Carbonate	2 mg.
Ascorbic Acid (Vitamin C)	50 mg.
NATURAL VITAMIN B COMPLEX EXTRACT	2 grammes

prepared from brewers' yeast and including

Aneurine hydrochloride (Vitamin B_1)	3 mg.
Riboflavine (Vitamin B_2)	6 mg.
Nicotinamide	30 mg.

and all the other naturally occurring factors of the vitamin B complex.

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Adrenoxyl has been used with success in those medical conditions associated with capillary fragility.

In the British Medical Journal (April 21st, 1956) a correspondent confirmed the value of Adrenoxyl in providing a dry field for the surgeon and in shortening the duration of the operation.

Packs

Ampoules: Boxes of 6 and boxes of 50.
Each ampoule contains 0.75 mg. of adrenochrome monosemicarbazone dihydrate.

Tablets: Tubes of 25 and bottles of 500.
Each tablet contains 2.5 mg. of adrenochrome monosemicarbazone dihydrate.

The best results are obtained when both tablets and ampoules are used.

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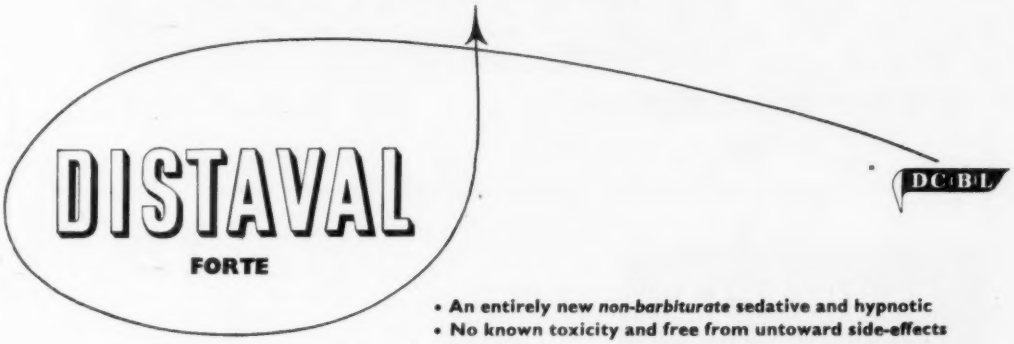

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FOR SEDATION:
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Infants and Children: Half to one 25 mg. tablet, according to age, 1 to 3 times a day

AS A HYPNOTIC:
One 100 mg. tablet 20 minutes before retiring

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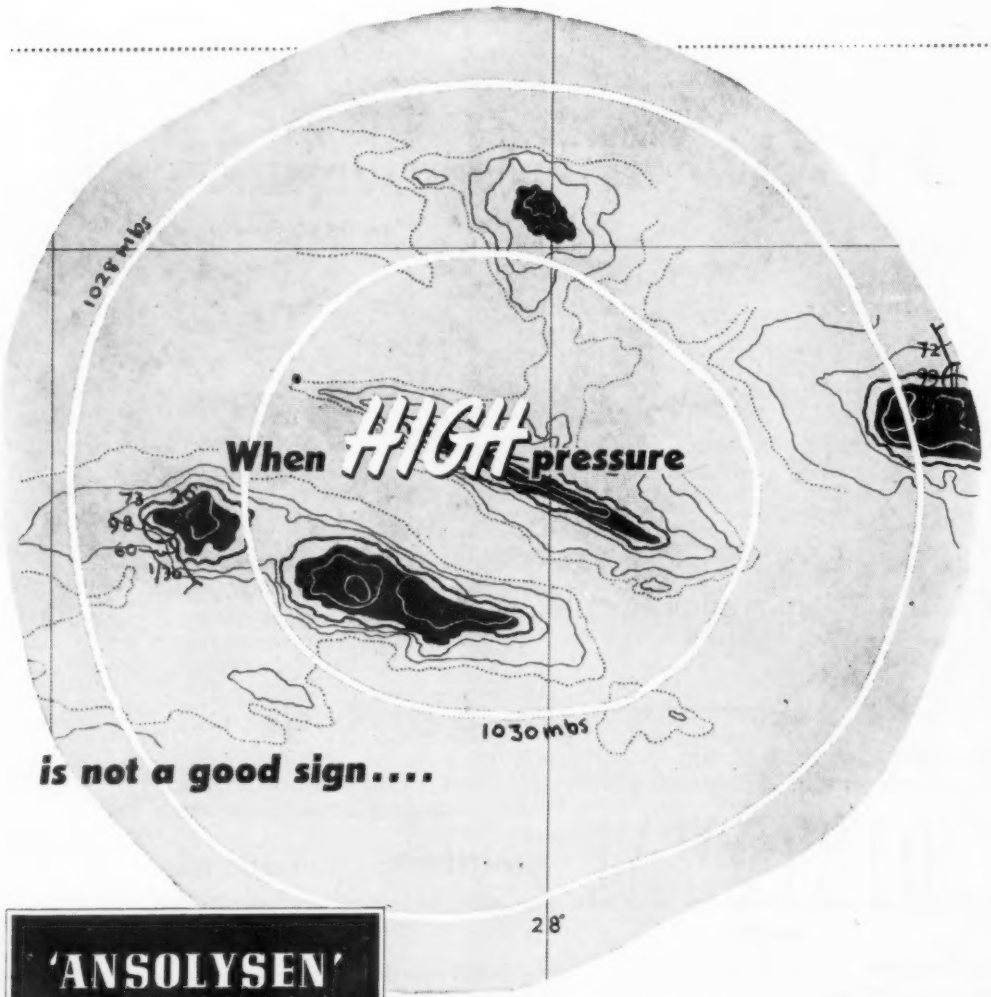

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PRESENTATIONS

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0·5% and 2·5% solutions
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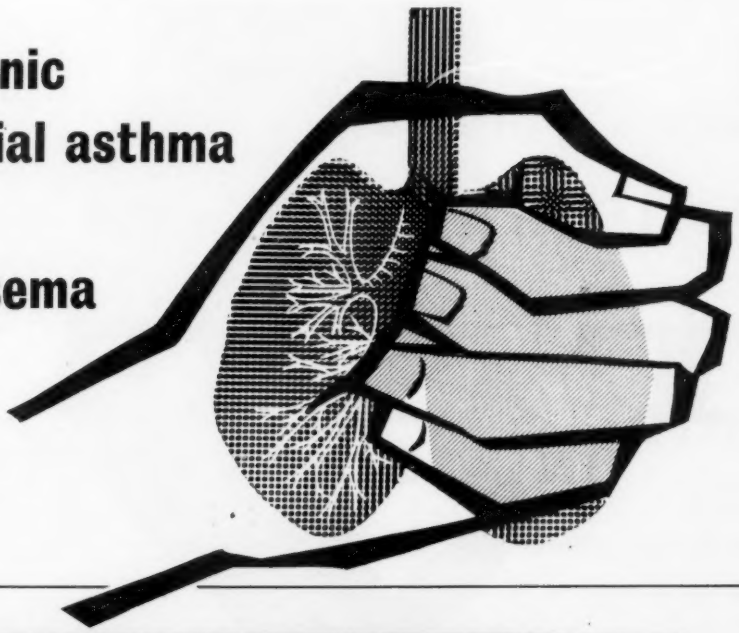

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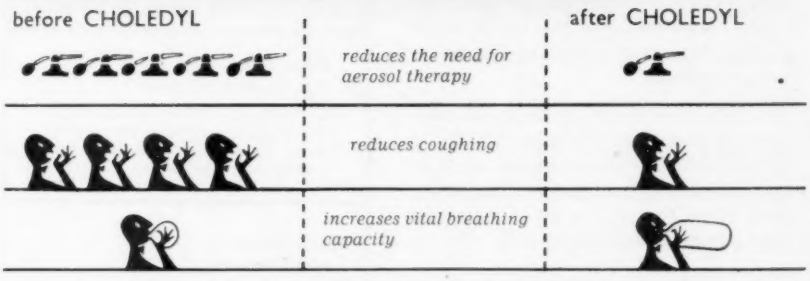

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STANDARD REFERENCE CARD ON APPLICATION

Choledyl is available in tablets containing 100 mg. and 200 mg. choline theophyllinate and is supplied in bottles of 100 and 500 tablets.

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IN THE MENOPAUSE

UNIQUE FAT STORAGE

Most of the advantages of 'TACE' are derived from its storage in body fat. Pharmacological evidence has been provided by articles published [1] [2], and from results demonstrated by radio autographs. Abundant clinical confirmation is also available.

No other œstrogen at present available has this property. Because 'TACE' is stored in body fat no sudden drop in œstrogen blood level occurs. The œstrogenic effect persists for up to 3 months after administration ceases.

High doses are unnecessary, since 'TACE' is metabolised by the liver to a more potent œstrogenic compound.

1. *Amer. J. Obst. Gynec.* (1952) **63**:1361.
2. *Proc. Soc. exp. Biol.* (1953) **84**:491.

DOSE: 2 capsules daily for one month.

PACKS: 'TACE' is available as green capsules, each containing 12 mgm. chlorotrianisene dissolved in oil: Bottles containing 60 and 300 capsules. The basic N.H.S. costs are 18/4d. and 73/-.

Feeling of Well Being

The feeling of well being, so important to the patient, is characteristic of 'TACE' therapy.

Smooth Prolonged Action with Fewer Side Effects

Fat storage results in a steady release of œstrogen, providing a smooth action which persists for some time after administration has ceased.

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Simplicity of Dosage

'TACE' is given on a fixed dosage scheme. Higher dosage does not produce greater fat storage.

Merrell Research

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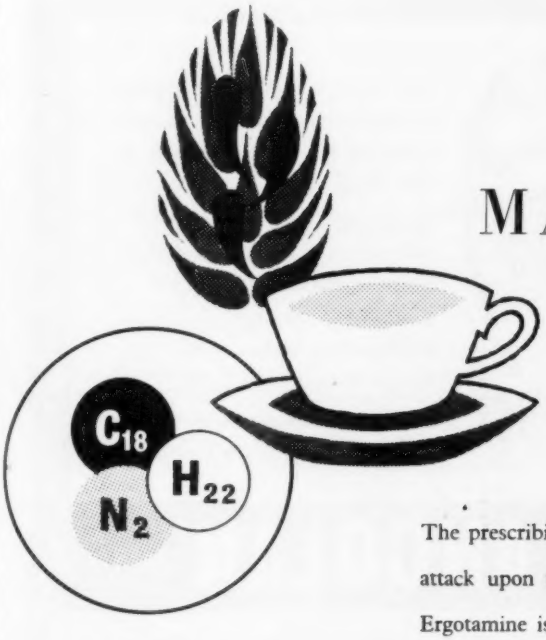

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Each tablet contains ergotamine tartrate 2 mgm.; caffeine (alkaloid) 100 mgm.; cyclizine hydrochloride 50 mgm. In bottles of 10 and 100

The prescribing of 'Migril' makes possible at last a *planned* attack upon the three predominant symptoms of migraine. Ergotamine is present at strength in 'Migril' for its specific effect upon the characteristic headache and ocular disturbances. Caffeine is present too, since it acts as a synergist to ergotamine. Frequently, however, ergotamine tends to evoke nausea and vomiting on its own account and can therefore worsen these aspects of the condition. For this reason, the potent, rapidly acting anti-emetic cyclizine is also included in 'Migril'—to overcome any tendency to nausea or vomiting, whether caused by the ergotamine or by the condition itself. And so successfully does cyclizine achieve this aim that truly effective oral doses of ergotamine can today be given—by means of 'Migril'.

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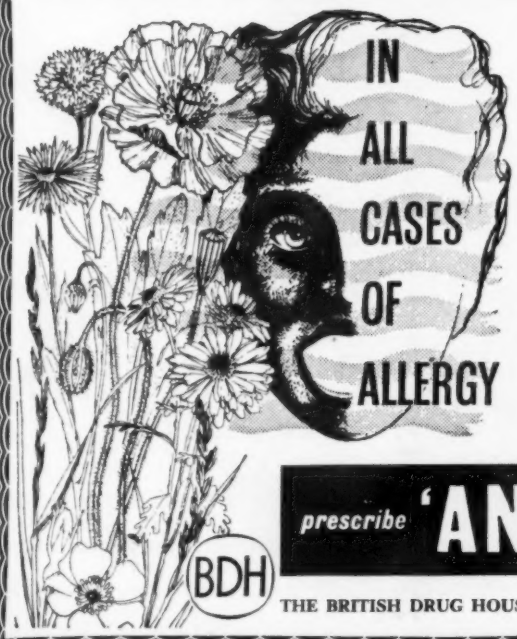

The active constituent, meclozine hydrochloride B.N.F. is an anti-histamine of low toxicity and 24-hour action.

DOSAGE:
Adults, one or two tablets daily
Children, one tablet at night

Basic N.H.S. prices:
Bottles of 25 tablets 3/8d
Bottles of 250 tablets 32/6d

Descriptive literature and specimen packs will be supplied on request.

prescribe **'ANCOLAN'** *tablets*
TRADE MARK

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The new complete treatment for migraine—

ORGRAINE

In a recent clinical article (J.A.M.A., 1957, 163, 1115) it was stated that in a series of 2,511 cases in which 28 agents were tested in the symptomatic treatment of migraine, ergotamine tartrate was proved to be the most useful drug—and 81% of the patients showed improvement when ergotamine tartrate and caffeine were compounded with belladonna alkaloids.

Orgraine applies the same successful principles of treatment.

Composition (per tablet)		Action
Ergotamine Tartrate B.P.	1.0 mg.	→ constricts dilated cerebral arteries.
Caffeine B.P.	100.0 mg.	→ potentiates ergotamine.
Hyoscyamine Sulphate B.P.C. (1949)	0.0875 mg.	→ alleviates nausea and vomiting.
Atropine Sulphate B.P.	0.0125 mg.	
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PACKS: Tablets individually foil-stripped, in boxes of 10 and 100.

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The Lancet · Saturday 10 May 1958

MEASUREMENT IN MEDICINE

MAX HAMILTON
M.D. Lond., D.P.M.
SENIOR RESEARCH FELLOW, DEPARTMENT OF PSYCHIATRY, UNIVERSITY OF LEEDS

LITTLE more than a century after the birth of scientific medicine the present day is seeing the beginnings of a new revolution—the infiltration of the ideas and methods of modern experimental biology. In all branches of medicine a drastic fundamental re-examination of even the longest-held cherished ideas and practices is pursuing its iconoclastic way, and many of these practices, when weighed in the balance, are found wanting.

These new ideas and methods are to be seen most clearly in the field of research, where they take the form of an increasing insistence on the proper design of experiments and statistical analysis of results. The clinical trials initiated by the Medical Research Council have given a lead in this field and set appropriately high standards. The same trends are visible also in clinical medicine, where they have appeared most prominently as an increasing dissatisfaction with the basis of clinical judgment, the rediscovery of "observer error", and a rather unsophisticated demand for the replacement of clinical observation and judgment by mechanical or "instrumental" methods. Particular emphasis has been placed on "observer error" in the assessment of radiographs of the chest, but, of course, the problem is a general one. A consideration of the fundamentals of this general problem should help in solving current difficulties.

I intend to show here, by starting with an analysis of the fundamentals of measurement and error, that clinical judgment and observation do not merely form an inaccurate method of doing something which ought to be done better, but have a legitimate and irreplaceable function in medicine.

Nature of Measurement

Measuring things is such a familiar activity that its nature appears to be self-evident. Only philosophers worry about it.

The simplest form of measurement is that in which a population is divided into two classes with and without a given attribute; each individual is, in effect, compared against a standard which has or has not the attribute. In a sense each individual acts as a standard. For example, we may classify persons in the street into those who are and those who are not wearing a raincoat. The common numerical equivalent of such qualitative dichotomies is that of 0 and 1. The average for the group represents the probability of finding an individual with the attribute.

A slightly less simple form of measurement is that in which the two classes differ on the basis of intensity of attribute. All members of the population possess it, some more and some less. For example, we may divide the population of men into those eligible and those not eligible for admission into the Police Force, in so far as they do, or do not, exceed a given height. This division could be made by comparing each individual with a standard individual who is of the lowest eligible height. In practice a ruler is used, being equivalent to the standard individual as regards the particular quality under consideration.

Instead of two classes the population may be divided into three or more classes, and in that case several standards will be required. The easiest way of supplying these standards is to use the members of the population as standards. Each individual is then compared with the others and judged to be greater or less. In this way the individuals can be ranked in a series in which the number of classes equals the number of individuals. The number of classes can be reduced by bringing together adjacent individuals into one class, and can be finally reduced to the lowest subdivision of two classes. This case reduces to the simpler procedure already described.

The arrangement of members of a population in an order is not restricted to one quality. A complex of qualities can be equally dealt with, as when it is decided that one patient is more ill or more in need of emergency treatment than another. Individuals can be placed in order of rank as regards more than one quality, but then the order will not necessarily be the same. If several qualities give rise to the same rank order, these qualities are probably not truly distinct and may perhaps represent different manifestations of the same essential or underlying quality. This point, and the problem introduced by errors which interfere with the "true" ranking, will be considered below.

The methods described so far enable us to make comparisons only within the population dealt with. If we wish to compare one population with another, we must have some method of reproducing the standard. This is not necessary where the individual members of one population can be compared with those of the other, but this is equivalent to saying that all the individuals can be assembled into one population. The essential point emphasised here is that measurement in its simplest form does not necessarily imply a standard which is reproducible in different places and different times. Such a reproducible standard is required only when comparison is between one population and another.

The usual method of making the comparison which is the basis of measurement is to observe together the standard and the individual to be measured. The comparison is "side by side". This is not always possible, and in medicine it is common for the standard to be not only absent but also impossible to obtain. Thus, when we compare a patient's present state with what he was previously, it is impossible to make a direct comparison. Comparison here is between the individual as observed and as he is remembered either by himself or by the physician. This method of comparison against a remembered standard is extremely common, both inside and outside medicine. For example, the possessor of "absolute pitch" can compare any note he hears with the notes of the scale which he remembers, and can identify its position exactly. Length can be similarly measured. One can judge a person's height with reasonable accuracy and in seaside resorts and fairs one can find people who earn a living by judging a person's weight in the same way.

There are other reasons why a comparison by simultaneous observation is not made; the commonest one is that in which simultaneous observation is impracticable—e.g., when two musicians are compared on the playing of the same piece of music. Another reason is that the standard is so complex that it is impracticable to make it. For example, the radiologist judges a radiograph of the chest to be normal or abnormal, and he does so by com-

paring it against a " standard radiograph " of a normal chest. Since no two chests are alike, the standard is more or less a sort of " average " obtained over the course of years and present only in the radiologist's mind. It must not be forgotten that a chest can be abnormal in many different ways. The physician listening to heart sounds or palpating an abdomen is in a similar position to that of the radiologist.

It is often assumed that measurement requires a second characteristic: the individual measures should be additive. The classical example of such additive measures are those of length and weight. Thus 5 cm. and 1 cm. not only equal 6 cm. but also equal 4 cm. plus 2 cm., and 3 cm. plus 3 cm. The same applies to pounds and kilogrammes. This additiveness is never completely true in all circumstances, and in most cases is rarely so. Even in the obvious example, that of distance, it is untrue when the distances become large enough. Thus a traveller who goes 10,000 miles away from his home and then a further 10,000 miles in the same direction is not 20,000 miles from home but 5000 miles from it. If he goes another 5000 miles he will be at his home. It might be said that this is so only because the earth is spherical; but, according to the theory of relativity, the same is true of the Universe as a whole; and the Universe, by definition, has nothing else outside it. In fact, many of the measures in science are not additive. Thus two specific gravities cannot be added together.

Theory of Errors

It may be laid down as a general principle that all observations (and these include measurement) are subject to error. For the present purpose errors may be subdivided into two groups: those due to errors of measurement, and those due to sampling of population. Errors of measurement may be subdivided into random errors and bias. There are special problems associated with the type of measurement that consists of comparison against a remembered standard.

Bias

Bias is produced by several factors, some of which are well known and can be dealt with, and others are less understood. One of the most important is that the standard may shift for various reasons. For example, if the observer examines a series of objects which change regularly in one direction (perhaps from normal to abnormal) by very small amounts, adaptation, which may be sensory (peripheral) or psychological (central), may shift his standard. An important example of this is the anæsthetist's difficulty in observing the appearance of cyanosis when it develops slowly. The reverse movement of the standard may be produced when extreme examples appear. Thus, minor signs may be regarded as positive, until the observer sees several examples of major signs, after which he will tend to disregard minor ones. The classical example of this is the examination for finger-clubbing in the chest clinic.

All such processes are psychologically an assessment of differences, and the minimum of perceptible difference is determined by several factors. One of them is the direction of approach; and, where it is necessary to eliminate this bias, it is usual for measurements to be made by approaching from both directions. For example, the astronomer measuring the position of a star on a photographic plate makes repeated measurements in half of which he moves his microscope to the star from the left and in half from the right. Such methods of increasing the accuracy of his measurements are particularly important because the image of a star produced by a telescope consists of a small disc surrounded by concentric circles. The centre of the small disc cannot be accurately found because its edges are not clear, and the random distribution of silver grains in the emulsion makes its outline difficult to define.

Attempts to eliminate bias in clinical medicine are not always made. Thus the old method of estimating blood-hæmoglobin of necessity introduced the bias of direction. The concentration of hæmoglobin was determined by putting a fixed quantity of blood, saturated with carbon monoxide, into a standard tube and diluting it gradually until it matched the standard specimen. The result obtained by diluting a concentrated solution will always tend to be different from that obtained by going in the reverse direction—i.e., by adding successive minute quantities of blood to a fixed quantity of water until its colour matches the standard.

Bias may even be useful sometimes. The minimal perceptible difference will be increased by fatigue but diminished by expectation; hence an observer who is expecting a change will detect it sooner than one who is not. When a clinician takes a patient's history, it may predispose him to take notice of slight signs which might otherwise be ignored. It is partly for this reason that the clinician emphasises the importance of taking a good history first and using it as a guide to further investigations, as opposed to starting off with a series of routine tests.

The traditional procedure for percussing the heart illustrates this very well. In the first place the history indicates whether the heart is likely to be affected and its size or position altered. The physician then palpates the chest to detect the apex-beat, and this sets one limit to the outline of the heart. He then percusses the upper level of the liver, partly because it is usually in a fixed position and partly because the contrast between lung and liver is the maximum that can be obtained in the chest. The physician has therefore, as it were, anchored his observations within certain limits and defined standards for the observation of small differences. The results of percussion are usually reasonably good.

Enthusiastic sceptics have made occasional attempts to determine the accuracy of percussion by asking clinicians to percuss one side of the heart without any of the usual preliminaries. The results usually demonstrate that such percussion is practically useless. One can sympathise with those clinicians who so good-naturedly allowed themselves to be placed in an unfavourable light, but one must still consider such so-called investigations as irrelevant.

There is a story of one such " inquiry " in which the physicians were asked to outline the heart of a cadaver from which the heart had been removed from behind. The story goes that they did not notice what had happened. If the experiment were to have any value at all, it should have been done on one of two cadavers, and the physicians asked to compare the two and to account for the differences, if any. This would have demonstrated what every clinician already knows, that percussion is appropriately informative in the right circumstances.

Bias cannot be eliminated by subjective attempts to correct it, because this may produce bias in the reverse direction or, as it is usually called, " leaning over backwards ". It can be reduced by methods of measurement which diminish the range for the play of subjective judgment, but they cannot eliminate it. For example, mobility and range of movement in a joint can be estimated by an observer, but the use of a protractor will tend to make the measurement more accurate. Even then movements of

the joint can be increased or diminished by enthusiasm or lack of it on the part of the patient and his physician, because often the limitation to movement is due to pain, which is extremely sensitive to emotional state. For this reason it is now well recognised that, in clinical trials, the treatment should be given as a " double blind "—i.e., neither the patient nor the physician knows which of two different treatments the patient has been given. The method fails when the treatments give such very different results that they can be detected easily, but in that case such precautions are unnecessary. On the other hand, serious difficulties arise when the results of the two treatments do not differ greatly, but they can be identified by the different side-effects. To deal with this requires not an understanding of statistics or experimental design but an intimate acquaintance with the clinical phenomena under investigation and the problems of dealing with them.

The shifting of the standard in the course of a series of observations can be corrected by designing an artificial reproducible standard and by comparing each observation with it. This is the method used by H. G. Wolff and his collaborators for measuring the degree of injection of gastric and colonic mucosa.

If anæsthetists thought it necessary to notice the appearance of cyanosis at the earliest possible moment they could do so by devising a gadget consisting of a red background, the colour of oxyhæmoglobin, which could be covered by one or more layers of opalescent material to simulate the skin, and by a buff transparent sheet to imitation pigmentation. In this way the anæsthetist could make a match for the appearance of the patient's ear and cheek before operation, and use it during the operation to detect the first appearance of cyanosis.

Temporary shifts of the standard due to the nature of the material examined can be reduced by dealing with small batches at a time and starting off by two standard specimens—e.g., radiographs, one of approved normal and the other abnormal. Failing such standards, it is a great help to make careful accurate detailed definitions of normal and abnormal, and to read them through before starting each batch.

Random Errors

Since bias is, by definition, those sources of error which tend to alter measurement in one particular direction, all other sources of error are random errors, and the theory of errors is concerned largely with them. In its simplest form it deals with the large number of possible causes which will tend to disturb a given measurement by a small amount. (Large disturbances must be eliminated in the experimental design.) These small sources of disturbance are independent (because if they are not they become one source in effect) and tend to increase or to decrease a given measurement according to the direction whence they come or, alternatively, whether they are absent or present. If they all act together in one direction, there will be a large error; if they act together in the opposite direction, a large opposite error will appear; and, if they act in opposite directions, the effects will tend to cancel each other out. On these assumptions it can be shown that large errors will occur rarely and small errors frequently, and the distribution of these errors will be that commonly called gaussian or " normal ".

If a graph be plotted of the frequency with which the different measurements occur it will be bell-shaped. Since the errors tend to be in either direction, in the long run they will occur equally in both. For this reason the simplest method of eliminating random error is to take many observations and to use their average (mean) as the " true " measurement. An illustration will make this clear and show the underlying complexities in practice.

A single measurement of a patient's blood-pressure is so liable to error that it is of little value in practice. If it is important to obtain as accurate an estimate as possible, the measurement should be repeated several times and the mean calculated. How often should the measurement be taken? This can only be answered in a statistical sense; the greater the number of measurements from which the mean is derived, the more reliable is the mean, and its reliability can be described in a statistical sense. This in itself may not be sufficient, for the observer himself may be liable to bias and random error. The latter is part of the total random error and need not be further considered, but the observer's bias can be eliminated only by comparing his measurements with those of other observers. If all observers were equally biased in one direction, the term true measurement—i.e., measurement without observers' bias—ceases to have meaning; but, if they differ either in amount or direction or both, bias can be eliminated by using many observers and taking the mean of the observers. Thus the best estimate of the patient's blood-pressure is the mean of measurements made repeatedly—e.g., daily—by many observers, and its accuracy can be determined by the usual statistical methods.

The customary way of recording such results is to place all the measurements made by one observer in a row, the measurements by another observer in a second row, and so on. Thus each row represents the measurements made by one observer, and each column represents the measurements for a given day. The mean of all the measurements may be regarded as being derived from the mean of observers or the means of successive measures. The total variation (statisticians use the " variance ") can be subdivided into that between days, between observers, and between observations, or residual. This will indicate whether the errors due to observers is greater or not than that due to the measures, and in consequence will give estimates of observer bias. (Technically this is the analysis of variance.)

The use of arithmetical means gives equal weight to all observations. It could well be argued that those measurements more remote from the mean should be given less weight than those nearer, and the same would apply to observers. Thus the best estimate of the mean would be obtained by a weighted summation of the results. If the observations are arranged in rows and columns as described, this is known as a matrix; and finding the set of weights is equivalent to finding the first principal component of the matrix or, in psychological terminology, a general factor.

The precision of a measurement can be increased by a comparatively small number of repetitions to such an extent that, even when the original measurements were comparatively crude, the final result is remarkably accurate. Thus, in an experiment by Keats, Beecher, and Mosteller, the analgesic effect of 10 mg. of morphine given postoperatively were compared with that of an unknown analgesic by deciding whether each injection was effective or not. The quantity of unknown analgesic equivalent to 10 mg. of morphine, determined by this apparently crude technique, was found; and the unknown analgesic being also morphine, the equivalent was found to be 10·8 mg. of morphine. This experiment shows how accurately a quantity can be measured, even though each individual measurement is made by dichotomisation into effective or non-effective, high or low, absent or present.

When the measurement is near or at the critical point at which the dichotomy occurs, it will be categorised as high or low 50% of the times equally. As the measurement moves above the critical point, the proportion of " high "

will increase towards 100%. Conversely, as it moves downwards, it will be recorded as " low " for an increasing proportion of the time. This is the method used in determining the lethal dose of a drug, which is defined as that dose which will cause death in 50% of the test animals. It forms the basis of most methods of biological standardisation. When such data are plotted as a graph they form an S-shaped (sigmoid) curve, which is derived from the gaussian curve by adding each frequency to the previous ones.

An Experiment on Clinical Judgment

A simple experiment was devised to demonstrate this method applied to the detection of cyanosis. A small rubber bag was fitted to a CO_2-absorbing canister, whose other end was fitted to a rubber anæsthetic mask. The bag was filled with air, and a volunteer breathed and rebreathed this air through the canister. As a result the oxygen in the contained air steadily diminished until finally the volunteer became cyanosed. The time required for the first appearance of cyanosis was about $1^1/_2$ minutes. The experiment was then repeated, and colour photographs were taken every 10 seconds. The photographs were made up into colour slides, and the first (normal), last (just detectable cyanosis), and three intermediate ones taken for the experiment. Several physicians were then asked to look at the slides one at a time, presented in random order, and to say whether they showed cyanosis or not. The five slides were run through ten times for each physician. Each slide was then given a score, being the number of times it had been rated as cyanosed. Only five observers were required to place the slides in correct order. The point of the experiment is that, when the last slide is compared with the first, it is only just detectably cyanosed; therefore the intermediate slides cannot be detected, because the cyanosis they show is below threshold.

Assessment of Chest Radiographs

The overwhelming majority of the pictures obtained from mass chest-radiography are normal; a few are grossly abnormal, and some show minor changes. It is these that form the subject matter of the controversies on observer error. We may now consider a hypothetical experiment. All the radiographs are placed in order running from the obviously normal to the obviously abnormal. A radiologist examines them and rates them as normal until a point is reached when he begins to be doubtful. He goes on until he reaches one that is obviously abnormal, and from then on, the rest are rated as abnormal. This could happen only if error could be eliminated, which is impossible.

However, there is a method by which error can be reduced to below any required minimum. This consists of repeating the examination of the radiographs and rating them anew. The original dichotomous rating will now be changed to three categories: those pictures rated as normal twice; those rated normal and abnormal once each; and those rated abnormal twice. Further repetitions of the procedure will eventually produce a series in which the pictures run from those found normal every time to those found abnormal every time. By analogy with the little experiment on judging cyanosis, if the observations have been repeated often enough, this order will correspond to the true order (theoretically, will tend indefinitely in that direction).

Several difficulties render this experiment impracticable. The first is that " abnormality " in a chest radiograph is not a simple matter. All sorts of qualities in the radiograph can separately deviate from the normal, and, in so far as these are independent, the resulting ranking orders will differ according to which has been reckoned to be the most important. The attitude of the radiographer may change at each viewing; hence he will not tend towards consistency. Other radiographers may differ from him in what they regard as important. To a limited extent these changes between different viewings and differences between different observers can be eliminated by careful discussion between them and, above all, by the formation of a collection of standard chest radiographs illustrating the different degrees of each type of abnormality. The difficulty lies here in that the clinical significance of " abnormalities " seen in chest radiographs is not yet fully understood. Much further work in following up these cases has yet to be done.

The point to be emphasised is that discrepancies between repeated observations and between different observers is something to be expected. It can be diminished by suitable methods—i.e., by the provision of standard radiographs and by the appropriate training of radiologists—but it can never be eliminated. The error produced by such discrepancies can be reduced to any level by sufficiently increasing the number of times each radiograph is observed and rated.

At this point a new difficulty appears—an operational problem. It is true that the number of cases of lung disease missed and the number falsely diagnosed as diseased can be diminished by increasing the number of times each radograph is examined; but a radiologist can only examine a limited number of pictures. For every picture that is examined a second, third, &c., time, the picture of a second, third, &c., subject cannot be examined. While the radiologist is ensuring that he does not miss any cases in one district, he is missing cases in other districts because he is not there examining them. In practice the gain on the one hand is not completely counterbalanced by a loss on the other. It is a long and troublesome job to collect people for mass radiography in a given district. It is easy and quick to examine the radiographs a second and even a third time. Of course, repeated examinations of radiographs need not necessarily hold up the activities of a mass-radiography unit. On the other hand, there are limits to the amount of work a radiologist can do merely in examining films. He needs to be refreshed by the experience of examining films of chest disease, and even by examining patients, follow-up work, and so on. It should not be impossible, all these problems being taken into account, including the structure of a mass-radiography unit, to work out a routine that would find the maximum of cases with the resources available. But operational research has not yet penetrated very far into clinical medicine.

Reduction of Errors of Measurement

The simplest and traditional method of reducing errors of measurement is that of instrumentation. Fundamentally this consists of finding a device that will magnify the changes to be measured—e.g., a long pointer. So far as possible, observations made through the various senses are converted into visual observations—usually a change of length. This is because the perception of small changes of length is more sensitive than any other. Instrumentation eliminates bias and usually reduces error to a negligible order.

Unfortunately it introduces new difficulties. Radiography will detect very small amounts of cardiac enlargement or very slight thickenings of lung tissue, but this sensitivity immediately raises the question of the limits of the " normal ". Examples of such problems are the size of the heart, basal metabolic rate, and blood-pressure.

(Of course, this problem does not arise when the difference between the normal and the abnormal is very great—e.g., phenylketonuria and galactosæmia). When small changes can be easily detected, the problem of interpretation becomes difficult.

Universal Unit for Clinical Tests

The practising clinician is faced with this problem in another way. The increasing number of biochemical and biophysical investigations (an increase which will continue for an indefinite period) means that the clinician has to burden his memory with an increasing number of standards. As a result it is customary for pathologists to indicate in their reports what is the accepted range of the normal. An even simpler way out of this difficulty would be that of determining the distribution of the measurements in healthy people, and then giving the measurement for the individual patient in terms of the standard deviation. The clinician would then know that any measurement differing from the normal average by two standard deviations would suggest a pathological deviation, and any measure more than three standard deviations would be almost certainly pathological. This would apply to any measurement—e.g., mean corpuscular volume, alkaline phosphatase, excretion of ketosteroids, and vital capacity. The introduction of such a uniform measure would be as beneficial to clinical medicine as the introduction of money was to a barter economy. An analogy to this is the introduction of the method of measuring electrolyte concentration by milliequivalents instead of milligrammes per 100 ml. This statistical unit is so simple that it would not be rash to prophesy that it will be almost universal before the century is out.

The theory of errors has been given in the customary form, in which each measurement is regarded as consisting of a part, the " true " measurement, and another part, the " error ". Since the " true " measurement cannot be obtained by any known operation it is a mythical entity. Present-day philosophy of science discards such mythical entities and confines its attention only to those results obtained by clearly defined operations. All possible measurements—e.g., of blood-pressure—are then treated as a " group ", of which any one is equally representative. A series of measurements is a sample from the group, and the mean, mode, standard deviation, &c., are regarded as properties of the group.

Sampling Errors

Sometimes we measure a group of individuals to determine the characteristics of the population, of which the group is regarded as a sample. Unless all the members of the population are exactly alike as regards the measurement (in which case only one individual need be measured), different samples will give different results. This situation arises when measurement is applied to the individual patient—e.g., when a sample of blood is taken for a cell-count. In a sense this applies to any function which varies—e.g., blood-pressure and hormone concentration. A series of measurements may then be regarded as a sample from all the possible measurements. What is required from the sample is an estimate of the characteristics of the population. The accuracy of this estimate depends on the size of the sample: the bigger the sample, the more accurate is the estimate. The only way to increase the accuracy (if the sample has been obtained in the best way) is by increasing its size. Instrumentation is of no help here, because this can only diminish the error of measurement. The size of the sample that is required depends on the variability within the population and the accuracy required. If the last two are given, the first can be calculated easily.

Measurement of Complex Functions

An excess or deficiency of a hormone gives rise to changes in many functions. What is the best way of measuring the excess or deficiency? Even when the blood concentration of the hormone can be measured this would not necessarily be informative, because different individuals show different concentrations under normal conditions, and it is very rare that the normal for the individual is known. Thus it is necessary to measure the changes in the functions concerned The easiest method of dealing with this is to measure the most important function. Unfortunately in practice this often means measuring the function that is most easily or most accurately measured.

If only one function is to be measured, the best one to choose is that which differentiates most between the normal and abnormal, taking into account the accuracy of measurement. The one measure is then an " index " of the total functions of the hormone. This is not often satisfactory; and, when one considers, for example, the history of the study of disease of the thyroid gland, one single index can be very unsatisfactory. What is required is some method of combining the results of measuring different functions to utilise all the information available. The technique for this is known and had been applied to medical problems three times.

The problem is that of finding suitable weights for the individual variables. We may regard subjects with obvious hypo-, hyper-, and eu-thyroid function as distinct groups. The measures of a sample from these groups are taken, and the dispersion matrix of these variables is calculated. This is divided into the dispersion between groups and the dispersion within groups. The former is divided by the latter, and the largest principal component of the resulting matrix gives the best weights for maximal differentiation between the groups. This is the method of multiple discriminant functions of Rao.

It is sometimes possible to measure a complex function by an appropriate complex measure. For example, if it is desired to compare two treatments for parkinsonism, it could be done by measuring the improvement of the handwriting of the patients. The handwritings of each patient in a group of (say) 20 is first ranked from the best to the worst. The first, second, up to the tenth pairs are taken, and the members of each pair allotted randomly, by tossing a coin, to one or other treatments. The patients are then given the treatments, and at the end of the trial samples of their handwriting are again taken and ranked in order. The change in rank order of one group compared with the second group would measure the difference in the effects of the treatments. To determine the reliability of the ranking it would be necessary to have the ranking done by at least two independent judges. The average of the rankings of the judges would also be more reliable.

Measurement of Subjective States

Contrary to popular belief, this is simple in theory and difficult in practice. Theoretically, the subjective state of the patient is manifested by his behaviour, and all that is needed is to find some appropriate form of behaviour. This may range from the patient's own statements about himself, in current jargon his " verbalisations ", to the way he deals with such complex problems as his relations to his family, friends, work, &c. This subject of psychometrics has been under investigation for over half a

century, and the literature is enormous. The practical problem is to find a suitable type of behaviour and to utilise the most appropriate method of measuring it. The example given above, ranking of handwriting, illustrates one common method.

Another way of measuring subjective states is to measure concomitant physiological functions. For example, the response to stress of the resistance of the palmar skin, due to sweating, can be used as a measure of anxiety; so also can the electroencephalographic sensitiveness to intravenous barbiturate. This is a very indirect form of measurement and is better regarded as an "index" rather than a direct measure. Indexes are very much used in medicine; thus the thymol-turbidity test is an index of liver function.

The trouble with such index measures is that their applicability is very limited. Thus measurement of skin resistance would be useless for assessing a tranquilliser that had some ganglion-blockading effect. Its relevance in patients who have cerebral damage—e.g., leucotomy—has not yet been determined.

Conclusions

Clinical observation has been the foundation of medicine, both in research and practice. It still is. It is a method which is liable to error, but so are all observations, however made. In recent years much attention has been paid to "observer error", whose presence has been mistakenly assumed to invalidate the method of clinical observation. Observer error can be diminished to any required degree by suitable techniques, as can any source of error of measurement. The value of clinical observation in research and in clinical medicine will increase, not diminish, as the methods of handling its limitations become more widely understood and utilised. The day is far distant, if it will ever be reached, when readings from machines will supersede clinical observation.

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THE ORAL TREATMENT OF PERNICIOUS ANÆMIA

A NEW APPROACH

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SINCE the early 19th century it has been appreciated that pernicious anæmia is associated with imperfect assimilation of food. The early work was clearly confirmed by Minot and Murphy in 1926 when they demonstrated that liver given by mouth can cause remission of the disease.

In 1929 Castle advanced his classical hypothesis that normal human gastric juice contains a factor ("intrinsic factor") which when given by mouth with a food factor ("extrinsic factor") found in meat, will restore the blood-picture in pernicious anæmia (see Castle 1953). Castle and Minot (1936) assumed that the two factors react together to produce the hæmatologically active principle, which is then stored in the liver and other tissues.

When crystalline vitamin B_{12} became available it was tested orally and found to be relatively ineffective. Ungley (1952), who summarised the results of several workers, concluded that in 21 cases of pernicious anæmia daily oral doses of 5 μg. or 10 μg. of crystalline vitamin B_{12} either had no detectable effect or produced a trivial response. When given with normal gastric juice, however, vitamin B_{12} proved to be nearly as effective as when given by injection (Berk et al. 1948). This led to the idea that extrinsic factor and vitamin B_{12} are one and the same thing (Castle 1953, Berk et al. 1948). Nevertheless, even in the presence of normal amounts of intrinsic factor, the intestinal absorption of vitamin B_{12} was found to be surprisingly small (Glass et al. 1954). Thus an increase in the oral dose of vitamin B_{12} from 0·5 μg. to 50 μg. leads only to an increase in hepatic accumulation from an estimated 0·45 μg. to 1·5 μg. Glass et al., therefore, postulated an intramural intestinal acceptor of vitamin B_{12}, and the non-absorption of increasing doses of vitamin B_{12} was attributed to saturation of this acceptor. According to present concepts, therefore, the absorption of vitamin B_{12} by the human intestine is a complex process involving the presence of a facilitating substance (intrinsic factor) and possibly an intestinal acceptor substance as well.

Castle's hypothesis has led to an enormous amount of work in the search for intrinsic factor.

Extensive reviews have been written by Ungley (1952) and Gräsbeck (1956), but few workers can agree even on limited properties for this elusive factor. Castle himself (Castle et al. 1930) concluded that the intrinsic factor "is certainly *not* pepsin", and this view was supported by the observations of Wilkinson (1930). Ternberg and Eakin (1949) showed that vitamin B_{12} combined stoichiometrically with a non-dialysable substance, apoerythein, in normal gastric juice. The vitamin in this combination is not available to microorganisms that need it as a growth factor; this microbiological technique was therefore used to assay the vitamin-B_{12}-binding principle. Eakin (cited by Hall 1950) found the concentration of apoerythein to be low in the gastric juice of pernicious-anæmia patients, and this led to the suggestion that apoerythein was identical with intrinsic factor. However, the relationship of the binding principle and intrinsic factor is by no means clear (Wijmenga et al. 1954b, Everse et al. 1953, Williams et al. 1954, Landboe-Christensen and Hoff-Jørgensen 1955, Noer 1954, Gad-Andresen 1954, Baker and Mollin 1955, Beerstecher and Altgelt 1951), and vitamin B_{12} can bind itself to many substances which have no intrinsic-factor activity (Gregory and Holdsworth 1953, Hall 1950, Wijmenga et al. 1954a).

Nevertheless, since the glandular mucoprotein fraction of gastric juice was found to potentiate to some degree the effect of orally administered vitamin B_{12} (Glass et al. 1951) the mucoprotein nature of intrinsic factor has become widely accepted. The findings of Ternberg and Eakin (1949) and Glass et al. (1951) suggest that intrinsic factor has a high molecular weight, and this has led to consistent attempts to prepare vitamin-B_{12} complexes containing a protein of high molecular weight with non-diffusible properties. Available commercial preparations of intrinsic factor, however, are extremely variable in their effects, and some may even inhibit the absorption of vitamin B_{12} (Williams et al. 1956).

There is a growing tendency to blame species specificity for the numerous failures of intrinsic-factor preparations (Wijmenga 1957, Schwartz et al. 1957). Nevertheless as *The Lancet* (1957) has pointed out, the treatment of pernicious anæmia with relatively crude preparations of hog's stomach over many years has been entirely satisfactory (see Wilkinson 1949). This editorial suggested that the cause of the failure of commercial preparations may well lie in their mode of preparation. However, it occurred to us that the fault might be even more fundamental, and that an entirely new approach to the problem of the ætiology of pernicious anæmia might be desirable.

There are certain well-established experimental facts. Firstly, we know that vitamin B_{12} is relatively ineffective by mouth, and that, alone, it cannot mature megaloblasts in vitro (Callender and Lajtha 1951). Thus the crystalline vitamin is not the active hæmopoietic principle per se. Furthermore, Robinson et al. (1954) have shown that, though most of the vitamin B_{12} in crude liver extracts is bound, it is not bound to protein as such, because the active vitamin can diffuse through 'Cellophane'. This seems to indicate that, in the anti-pernicious-anæmia principle, the vitamin is bound to a molecule of fairly low weight—e.g., a peptide. Finally, almost all forms of vitamin B_{12} available as food are bound to proteins of high molecular weight and are thus non-diffusible through cellophane and non-assimilable by microorganisms. This suggested to us that a simple proteolysis may take place in the stomach, in which the "bound" protein attached to the vitamin is degraded into a peptide. In this "free" form it could then be simply absorbed by diffusion through the gut wall, and thence travel to the storehouse of the liver, to be released again into the blood-stream under the action of an enzyme, erythropoietin (Fried et al. 1957) as required.

On this new hypothesis the inconsistencies in the action of intrinsic-factor preparations can be accounted by variation in the molecular size of the bound protein components in such mixtures. Thus it is not surprising to find that vitamin B_{12}, when bound to material of high molecular weight, even though the latter be comparatively pure, does not show any activity when given orally to patients with pernicious anæmia—e.g., the sow's-milk-protein complex of Gregory and Holdsworth (1953) and the purified cobalamin-protein (hog) of Wijmenga et al. (1954a), which had molecular weights of 55,000 and 70,000 respectively.

Good evidence for our hypothesis would be obtained if it could be shown that a peptide derived not from an animal intestinal (intrinsic) source but from a mould or bacterial (extrinsic) source promoted the oral absorption of vitamin B_{12} (as the complex) in pernicious-anæmia patients, and, in small doses, maintained such patients in health. A brief outline is given below of the isolation and properties of such a vitamin-B_{12}-peptide complex which possessed none of the properties which previously have been claimed to be necessary for absorption of the vitamin by the human intestinal tract.

Properties of the Complex

The active vitamin-B_{12}-peptide complex (H.P.P./1) was derived initially from fermentation of a Streptomyces mutant under standard conditions. The cobalamin-peptide was released from the protein complexes within the cells and concentrated and purified by a series of steps involving ion-exchange chromatography, counter-current solvent extraction, activated-carbon treatment and ammonium-sulphate precipitation. A red precipitate was finally obtained which possessed the following properties:

The vitamin-B_{12} portion of the complex was estimated spectrophotometrically at 550 mμ, at which wavelength the interference of the peptide portion is very small. The ratio of peptide to vitamin B_{12} on a weight basis was 6·8 : 1 and, assuming a 1 : 1 molecular ratio of vitamin to peptide, the molecular weight of the complex would be about 10,000. The true figure was probably less than this in view of the fact that the complex was dialysable and ultrafiltrable through cellophane and collodion membranes. The complex did not appear to dialyse, however, against ammonium-sulphate solution under conditions which enabled the uncombined vitamin to do so.

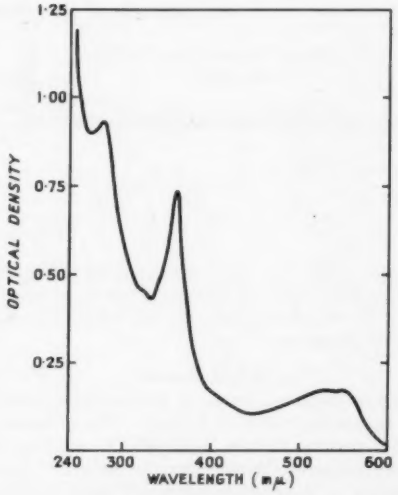


Fig. 1—Absorption spectrum of H.P.P./1.

The ultraviolet and visible absorption spectrum of H.P.P./1 (fig. 1) possessed absorption maxima at 277 mμ, 361 mμ, and 550 mμ—i.e., in the same positions as those of vitamin B_{12}. The maximum at about 277 mμ was appreciably greater than the corresponding peak value for the pure vitamin.

Both paper chromatography and paper electrophoresis showed the presence of only one vitamin-B_{12}-peptide. Acid hydrolysis of the peptide component by 6N HCl at 100°C for twenty-four hours yielded a mixture of aminoacids, of which the following were identified by paper chromatographic separation and appropriate staining: glutamic acid, aspartic acid, glycine, alanine, valine, proline, serine, threonine, arginine, cystine (or cysteine), leucine, isoleucine, phenylalanine, lysine, and histidine. Methionine and hydroxyproline were not detected.

Alkaline hydrolysis, followed by paper chromatography, established, with specific reagents—e.g., Ehrlich's reagent—the presence of the essential amino acid tryptophane.

For accuracy in administration of the tiny doses of active complex required, the vitamin content was estimated both spectrophotometrically at 550 mμ as mentioned above and by direct microbiological assay using *Ochromonas malhamensis* as the test organism. That the vitamin in H.P.P./1 was directly assayable by organisms that require the vitamin as a growth factor shows that, according to generally accepted terminology, the vitamin was "free" and not "bound".

Maturation of Megaloblasts

Although it has been shown that folinic acid, folic acid, and vitamin B_{12} plus normal gastric juice bring about the maturation of megaloblasts in vitro, neither crystalline vitamin B_{12} nor gastric juice alone has any such effect (Callender and Lajtha 1951).

An attempt was therefore made to discover the effect of the vitamin B_{12}-peptide complex on megaloblasts in culture. The technique was based upon that described by Lajtha (1952), except that Ringer's solution was used instead of Gey's, and it was found that the addition of 50 units of penicillin added to each tube reduced the risk of contamination. The final concentration of homologous-serum in the culture medium was 80%. The

18 HR. CULTURES OF MEGALOBLASTIC MARROW IN 80% HOMOLOGOUS SERUM

Case no.	Initial count		Cultures in					
			80% serum (8 ml.)		80% serum (8 ml.) + 7·8 µg. H.P.P./1 (vitamin B_{12} 1 µg.)		80% serum (8 ml.) + 1 mg. of folic acid	
	Megaloblasts %	Normoblasts %	Megaloblasts %	Normoblasts %	Megaloblasts %	Normoblasts %	Megaloblasts %	Normoblasts %
5	94	6	87	13	55	46	59	41
6	90	10	72	28	35	65	32	68

500 cells were counted on each film.

results are given in the accompanying table, which shows that maturation takes place about as rapidly in the presence of vitamin-B_{12}-peptide as with folic acid in eighteen-hour cultures.

Clinical Results

Six newly diagnosed cases of pernicious anæmia were treated exclusively with H.P.P./1. The patients were four males and two females, aged 42–72. A seventh case, which had begun to develop signs of subacute combined degeneration of the cord on treatment with another oral preparation containing intrinsic factor, is described separately below.

Pernicious anæmia was diagnosed in every case by a full examination of peripheral blood, a histamine-alcohol test-meal, and biopsy of the sternal marrow (hæmoglobin 100% = 14·8 g. per 100 ml.).

Reticulocyte-counts were done in each case for at least three days before treatment to exclude the possibility of a coincident spontaneous remission.

Dosage

As has been mentioned already, the ratio of peptide to vitamin B_{12} in H.P.P./1 is 6·8:1. Thus 100 µg. of vitamin B_{12} is contained in 780 µg. of H.P.P./1. For the sake of clarity the dose is given below in quantities of H.P.P./1 with the vitamin-B_{12} content in parentheses. At no time was crystalline vitamin B_{12} given either orally or parenterally, except where specifically mentioned in case 7.

Broadly speaking, treatment of pernicious anæmia is carried out in two consecutive uninterrupted stages: (1) correction of the deficiency of vitamin B_{12}, and (2) maintenance of the patient on a lower dosage. Ultimately the success or failure of any preparation will be judged on the second stage, for it has been shown (Blackburn et al. 1955, Mooney 1956) that a good initial response to oral therapy is no guarantee of successful maintenance over long periods.

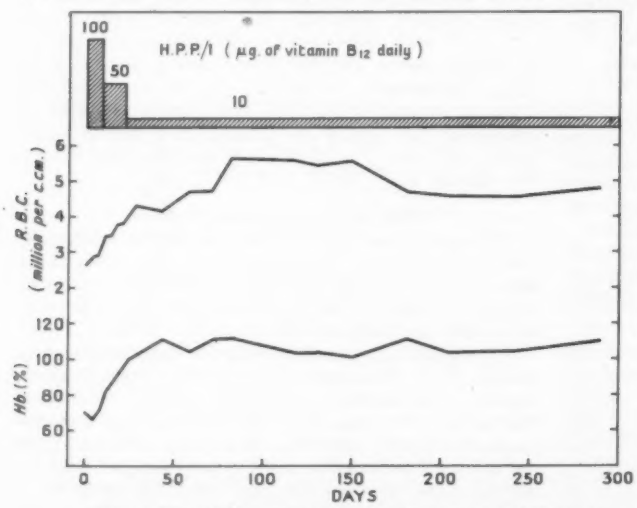


Fig. 2—Case 1 (male, aged 44): blood response to oral H.P.P./1.

Initial dose.—As it is generally agreed that the liver contains 1–2 mg. of vitamin B_{12} in health, it was decided to give case 1 780 µg. of H.P.P./1 (vitamin B_{12} 100 µg.) daily for eight days, and then half that amount for fourteen more days (total dose of vitamin B_{12} 1500 µg). Dosage was varied slightly in subsequent cases but never exceeded this amount in the first three weeks' treatment.

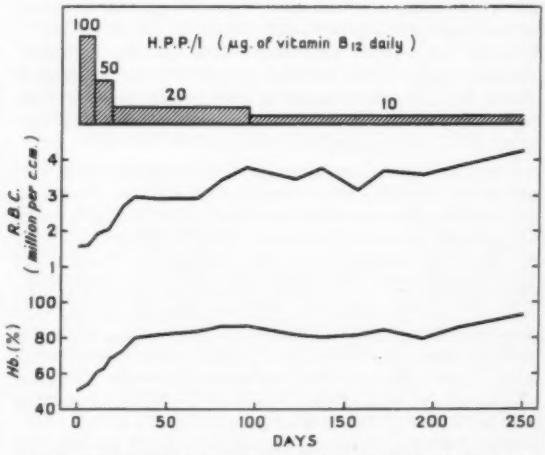


Fig. 3—Case 2 (female, aged 72): blood response to oral H.P.P./1.

Maintenance dose.—As already mentioned, Ungley (1952) considered that a daily oral dose of 5–10 µg. of crystalline vitamin B_{12} had no detectable effect on the blood-picture. Thus, if a patient could be maintained in health within this range of dosage, it would be reasonable to presume that the preparation was effective. Accordingly 78 µg. of H.P.P./1 (vitamin B_{12} 10 µg.) was given as a daily maintenance dose in each case, except the following:

Case 2 received 156 µg. of H.P.P./1 (vitamin B_{12} 20 µg.) from the 22nd to the 95th day of treatment, through fear that absorption might be impaired because she was aged 72. After the 95th day this dosage was reduced to 78 µg. (vitamin B_{12} 10 µg.), and it has remained at this level up to now (246th day) without deterioration in the blood-picture.

Case 3 received no treatment from the 68th to the 130th day, and his blood-picture deteriorated. A single dose of 1560 µg. of H.P.P./1

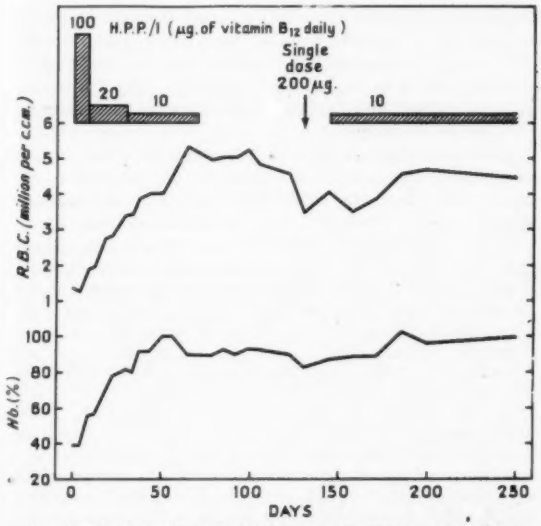


Fig. 4—Case 3 (male, aged 62): blood response to oral H.P.P./1.

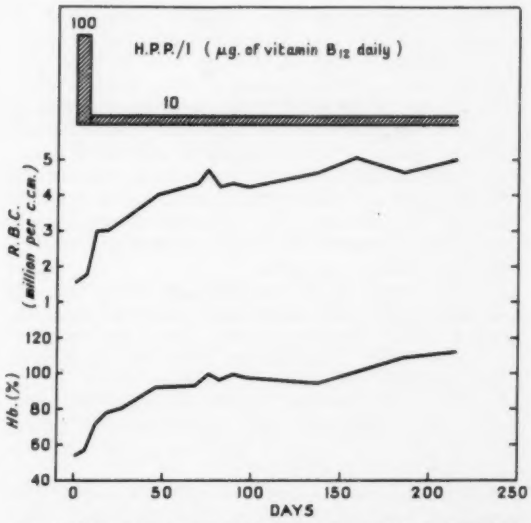


Fig. 6—Case 5 (male, aged 42): blood response to oral H.P.P./1.

(vitamin B_{12} 200 μg.) was given on the 131st day, and from the 145th day up to now (186th day) he has received 78 μg. (vitamin B_{12} 10 μg.) daily.

Case 6 was given weekly instead of daily doses, and from the 74th to the 123rd day she received 312 μg. of H.P.P./1 each week (vitamin B_{12} 40 μg.). As the blood-picture was suspected to be deteriorating (fig. 7), the weekly dose was increased to 546 μg. (vitamin B_{12} 70 μg.) on the 124th day.

Results

There was a good hæmatological and clinical response, which has been maintained in all six cases, for periods ranging from 140 to 290 days (figs. 2–7). A reticulocyte crisis with maxima of 11–17% developed at about the end of the first week in every case, and the average daily increases in red cells and hæmoglobin in the first 28 days' treatment were 47,000 per c.mm. and 1·07% respectively. No case up to now has developed signs either of cord deterioration or of iron deficiency.

Case 7.—A woman, aged 52, had been treated with another oral preparation ('Bifacton') since pernicious anæmia had been diagnosed sixteen months previously. She had responded well and had been maintained in health during this time but then began to experience difficulty in both standing up and walking, also she noticed numbness of her feet. On examination vibration sense was absent over both ankles, her knee-jerks and ankle-jerks were sluggish and her plantar reflexes equivocal. Sensation to cotton-wool was absent on the soles of both feet. Her red cells numbered 4,300,000 per c.mm. and her hæmoglobin was 94%. Early subacute combined degeneration of the cord was diagnosed, and it was decided to treat her with the oral peptide complex H.P.P./1 in larger doses.

Treatment.—For the first three weeks she received 2340 μg. of H.P.P./1 (vitamin B_{12} 300 μg.) daily and thereafter 1560 μg. of H.P.P./1 (vitamin B_{12} 200 μg.) daily for eight more weeks. Oral treatment then had to be abandoned owing to shortage of experimental material, and the patient was given 1000 μg. of parenteral crystalline vitamin B_{12} weekly.

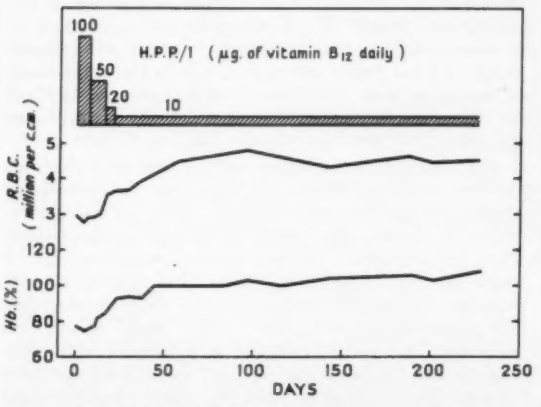


Fig. 5—Case 4 (male, aged 64): blood response to oral H.P.P./1.

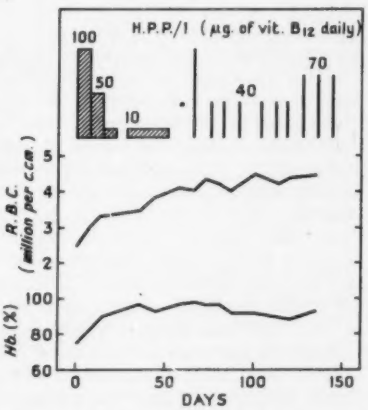


Fig. 7.—Case 6 (female, aged 62): blood response to oral H.P.P./1.

Progress.—During the eleven weeks' oral therapy an unequivocal subjective improvement took place. Her walking improved, and her sensory symptoms diminished. Vibration sense returned to all her malleoli except the right internal, and her reflexes showed no detectable change either way. This improvement has been maintained on parenteral treatment. During twenty-four weeks' oral and parenteral treatment, her blood-count has remained essentially unaltered, and her latest red-cell count is 4,700,000 and her hæmoglobin 97%.

Discussion

The current view on the ætiology of pernicious anæmia is that the absorption of the extrinsic factor (crystalline vitamin B_{12}) is facilitated by combination with the intrinsic factor. Furthermore, an additional or third

factor is required (Glass et al. 1954) to bring about the absorption of such a large molecule in the small intestine.

As crystalline vitamin B_{12} does not exist in nature but is found mostly in the " bound " form, then, if these views are correct, at some stage the crystalline vitamin must be completely detached from this protein of high molecular weight. This splitting is difficult to bring about in the laboratory (Lester-Smith 1948), and whether it could occur in normal digestion in the stomach is doubtful. We are certainly not aware of any reports that crystalline vitamin B_{12} has been produced in vitro from gastric secretions alone.

Likewise there is no laboratory evidence that the crystalline vitamin, if it occurs as such in the stomach, combines with a specific intrinsic factor, for none has yet been isolated. This does not mean that the vitamin cannot combine with the mucoproteins found in the stomach. On the contrary, there is evidence (Hall 1950, Gregory and Holdsworth 1953, Wijmenga et al. 1954b) that the crystalline form of the vitamin will combine readily with various proteins.

There remains too the question how this non-dialysable complex is transported across the intestinal wall. The third factor of Glass et al. (1954) is hardly a satisfactory explanation, because it has not yet been isolated. Thus, if present concepts are correct, stomach juices must be capable of freeing vitamin B_{12} from all protein adherents; furthermore, two factors—the intrinsic and the third factors—must also exist, neither of which has yet been isolated or identified.

If the currently accepted ideas are correct, it should be possible to treat patients successfully by giving them orally a preparation of intrinsic factor together with a relatively small dose (say 30–45 μg.) of vitamin B_{12}. Although several such preparations of vitamin B_{12} and intrinsic factor have been marketed, the results have been disappointing (Blackburn et al. 1955, Schwartz et al. 1957). However, for reasons mentioned already, we believe that the true cause of the failure lies in something even more fundamental than this—namely, that the disease is due to a failure of simple proteolysis in the stomach. In suggesting this we are largely returning to the original conception of the nature of pernicious anæmia proposed by Castle et al., who as long ago as 1930 said that it was " due to a virtual deficiency brought about, even in the presence of a diet adequate for the normal individual, by defective gastric digestion of protein as a result of the achylia gastrica ".

This idea was largely discarded when it was found impossible to obtain a remission in the disease by giving pepsin and hydrochloric acid (Wilkinson 1930, Castle et al. 1930), and its place has gradually been taken by the modern conception of an actual synthesis of the two factors—intrinsic and extrinsic—to form the hæmopoietic principle. The isolation of crystalline vitamin B_{12} (Lester-Smith 1948, Rickes et al. 1948) and its equation with the extrinsic factor (Castle 1953, Berk et al. 1948) have strengthened this later view. Nevertheless, as the search for the intrinsic factor has so far been unsuccessful, it cannot yet be claimed that this modern concept of the nature of pernicious anæmia is proven. Indeed, from the results reported here it appears that Castle's original views may still be correct, for we have found it possible to bring about a remission in this disease by the agency of vitamin B_{12}-peptide complex.

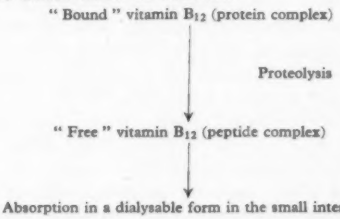
As the naturally occurring vitamin is mostly bound to protein, it seems to be an inescapable conclusion that degradation of protein must, at some stage, take place in the normal assimilation of vitamin B_{12} from food. Furthermore, as no animal intrinsic factor is involved in the preparation of H.P.P./1 at any stage, doubt must be cast not only on its supposed rôle in pernicious anæmia but also on its existence.

Before returning to Castle's original theory and restating it in the light of the results reported here, we must make clear the distinction between the confused terms " free ", " bound ", and crystalline vitamin B_{12}.

To say that the vitamin is in the " free " form usually means that it is utilisable by those microorganisms which require it as a growth factor; and in this state it is presumably capable of diffusing through the cell wall of the organism. Although the crystalline form is always " free " in this sense, the terms " crystalline " and " free " are not synonymous; nor are estimations of " free " and crystalline vitamin B_{12} in a given sample necessarily identical (Ford 1953, Hutner et al. 1956). It is even possible to obtain variable estimations of " free " vitamin-B_{12} content—depending on the type of organism used—on a sample in which it is known that the amount of crystalline vitamin is constant. *Escherichia coli*, for example, gives consistently higher values of " free " vitamin-B_{12} content (Ford 1953) than does *Euglena gracilis* or *Ochromonas malhamensis* (Hutner et al. 1956). As non-crystalline " free " forms of the vitamin have some peptide attached, probably this plays a variable part in the assimilation and/or utilisation of the vitamin by the test organisms.

The term " bound " vitamin B_{12} means that, in this form, it is non-assimilable and non-utilisable by microorganisms. It is readily converted into its " free " counterpart either by heating in an acid medium for fifteen minutes at 100°C or by proteolytic digestion. Thus the conversion of " bound " into " free " vitamin B_{12} appears to entail a reduction in molecular size of the protein attached to the vitamin.

Applying these terms, Castle's (1930) original theory might be stated anew as follows:


" Bound " vitamin B12 (protein complex)
Proteolysis
" Free " vitamin B12 (peptide complex)
Absorption in a dialysable form in the small intestine.

In other words, we believe that the complex containing a protein of high molecular weight, in which form vitamin B_{12} usually occurs in nature, is converted in the stomach into a complex containing a peptide of low molecular weight which is dialysable and assimilable by micro-organisms. On this theory, extrinsic and intrinsic factors are no longer necessary; nor is the third factor of Glass, because this " free " form of the vitamin will be of a suitable size for simple absorption in the small intestine.

From the clinical results presented here it is clear that patients with pernicious anæmia can be adequately maintained on oral daily doses of 10 μg. of vitamin B_{12} when the latter is combined as a peptide complex derived from fermentation. If these results mean anything, it must be that an intrinsic factor from animal sources, whether homologous (human) or heterologous (hog, &c.) is not essential for absorption of the vitamin. We believe, therefore, that intrinsic factor, as currently understood, has no real existence per se, and that the fundamental process preceding absorption of vitamin B_{12} is simply one of normal degradation or digestion of animal protein.

Despite the lack of direct proof as yet, this conception of impaired proteolysis as the cause of pernicious anæmia seems to be more rational and physiological than that currently held whereby both degradation and synthesis are alleged to occur simultaneously in the same organ. Furthermore, as vitamin B_{12} is usually found in the " bound " form in nature, it seems unlikely that it should be rendered " free " only to be " bound " again before absorption.

In any case it is also clear from the present clinical results that H.P.P./1 is the most effective oral preparation yet described, because the ratio of peptide to vitamin is only 6·8:1. In other oral preparations the attached or admixed proteinaceous material (so-called " intrinsic factor ") has never been less than 200 parts to 1, and usually the ratio is higher. Furthermore, this preparation matured megaloblasts in vitro at about the same speed as did folic acid.

Since crystalline vitamin B_{12} alone cannot bring about maturation, vitamin B_{12} seems to be more acceptable nutritionally for maturation when combined as a peptide complex and is, in this form, a closer approximation to the anti-pernicious-anæmia factor of liver than is the purified vitamin. In this connection Murphy's (1954) caution that " further critical study is necessary before vitamin B_{12} is accepted as a complete substitute for either whole liver or liver extracts " is not without significance. Indeed it seems likely that the vitamin might not only be absorbed but also be utilised in some similar form to this natural preparation H.P.P./1. Finally, we do not, on the evidence at present available, suggest that all " free " forms of the vitamin—i.e., all peptide complexes—are necessarily effective clinically; but, from the results of more recent work to be published later, it appears that all active forms are probably " free ".

Summary

A brief outline is given of existing theories of the causation and treatment of pernicious (Addisonian) anæmia.

Some of these have been responsible for the pursuit of intrinsic-factor preparations of high molecular weight which have not proved especially efficacious.

No hypothesis so far has been able to completely and satisfactorily explain the mode of transport of vitamin B_{12} into the blood-stream.

A new hypothesis is put forward that the orally active form of the vitamin is a peptide complex.

Such a vitamin-B_{12}-peptide has been isolated from a fermentation of streptomyces, and it has been shown clinically to be the most effective oral preparation yet available.

It is postulated that this active complex could be produced in the stomach by simple proteolysis, and that the intrinsic factor probably does not exist.

It is a pleasure to acknowledge the ready cooperation we have received from Dr. E. T. Baker-Bates and Dr. G. M. S. Ryan, who kindly allowed us to use some of their cases. We thank the directors of the Distillers Co. (Biochemicals) Ltd. for permission to publish certain details of the method of preparation of H.P.P./1.

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A CLINICAL TRIAL OF CHLORPROMAZINE AGAINST BARBITURATES IN TETANUS

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THE two principal current methods of controlling severe tetanus convulsions are the use of sedative drugs and neuromuscular block with artificial respiration. The latter method is only suitable for special centres since the technical facilities required are considerable; moreover it has yet to be conclusively demonstrated that this method is a therapeutic advance. It may ultimately prove essential for the more severe cases, but most cases of tetanus in the world will continue to be treated by simple sedation methods because the disease tends to be common where medical services are underdeveloped.

We have been impressed by the prominence of polypharmacy in published reports of tetanus and by the absence of properly designed clinical trials by which individual drugs might be evaluated. We compare here two sedation methods of treatment which were given concurrently, patients being allocated at random to one of two treatment groups.

Design of Clinical Trial

Chlorpromazine was compared with barbiturates, and the trial was conducted on African and Indian patients admitted to the same unit at King Edward VIII Hospital, Durban.

DR. HEATHCOTE, DR. MOONEY: REFERENCES—*continued*

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When the clinical diagnosis had been made, the patient was allocated to a treatment group by opening the next of a series of envelopes containing cards randomised between these two treatments by Dr. D. D. Reid, of the statistical research department, London School of Hygiene and Tropical Medicine.

To make sure that any differences between the two groups were due to the drug treatment only, all other treatment was standardised as far as possible. Patients were also divided into two main groups, neonates and non-neonates.

Standardised Treatment

Non-neonates

Procedure on admission.—The patient was put on a bed and sedated with the appropriate drug, given intramuscularly or intravenously according to the severity of the tetanus, and the test dose of antitoxin was administered. He was then left alone for thirty minutes, after which time he was undressed, the main doses of antitoxin were given, the wound was tended, and any necessary nursing procedures were performed.

Tetanus antitoxin.—All the patients received a subcutaneous test dose of 800 I.U. of tetanus antitoxin. Thirty minutes later 100,000 I.U. was given intramuscularly, and thirty minutes after that all the patients aged more than 10 years were given 100,000 I.U. intravenously.

Chemotherapy.—All the patients who were aged more than 10 years were given 600,000 units, and those aged less than 10 years 300,000 units, of procaine penicillin twice daily intramuscularly during the course of the disease. If clinical pneumonia developed, soluble penicillin 500,000 units was given four-hourly to patients aged more than 10 years, and the same dosage six-hourly to those aged less than 10 years.

Feeding.—At first a nasal or an oral stomach-tube was passed on all the patients, but later this was not done until the patient had shown himself unable to swallow. Feeding was with a suitably fortified egg-and-milk mixture. Intravenous feeding was undertaken when tube-feeding failed for any reason, or if the patient was dehydrated.

Nursing procedures were carried out as far as possible an hour after a sedative injection.

The wound was treated as it would have been if the patient had not got tetanus.

Neonates

The procedure on admission was to sedate the patient as for the non-neonates. No test dose of antitoxin was used; 50,000 I.U. was injected intramuscularly.

Benethamine penicillin 300,000 units was injected intramuscularly every third day. If clinical pneumonia developed this was changed to 500,000 units of soluble penicillin six-hourly.

The umbilicus was cleaned with hydrogen peroxide, and merthiolate was applied to it.

Feeding was by nasal or by oral tube, or intravenously if this failed. At the beginning of the trial expressed breast-milk, or substitute, was given four-hourly, but this was altered to half the amount two-hourly because regurgitation developed, with its attendant risk of aspiration pneumonia. Hartmann's solution was given through the stomach-tube if the child appeared dehydrated. The infants were nursed with the foot of the cot raised so that bronchial and oral secretions would tend to flow out.

Drug Dosage

This varied at first but was soon standardised as follows:

Barbiturates

Non-neonates.—Phenobarbitone sodium was the standard treatment. An adult with typical moderately severe tetanus received about 200 mg. intramuscularly three- to six-hourly at first, according to the frequency of convulsions. When sedation was needed urgently, amylobarbitone sodium 0·25–1·00 g. was given either intramuscularly or intravenously.

Neonates were similarly treated with intramuscular phenobarbitone sodium 60 mg. six- to eight-hourly at first, with longer intervals after the first two or three days because of the cumulative action of the drug.

Chlorpromazine

Non-neonates.—An adult with typical moderately severe tetanus received 100–150 mg. intramuscularly four- to six-hourly. A total of 1 g. in twenty-four hours was seldom exceeded. Similar doses were given intravenously where control of convulsions was urgent. At first, when patients appeared mentally distressed, promethazine, chemically close to chlorpromazine, was used in an attempt to increase sedation. It was ineffective for this purpose and was soon abandoned.

Neonates were similarly treated, regard being paid to their age, 20–25 mg. being given four-hourly initially. A total of 220 mg. in twenty-four hours was seldom exceeded.

In all the cases drugs were given orally only during the stage of recovery.

Assessment of Severity

The severity of the tetanus was classified as follows:

Mild: rigidity but no reflex spasms.
Moderate: reflex spasms present but either mild or infrequent.
Severe: frequent severe reflex spasms.

Results

Tables I and II compared the two treatment groups. Table III gives the mortality figures. Table IV gives the complication-rates and feeding routes. Table V gives the principal prognostic criteria of tetanus, the period of onset—the time from the first symptom to the first generalised reflex spasm (Cole 1940)—and the incubation period.

Discussion

Choice of Drugs

Barbiturates were chosen because they are well known to arrest tetanus convulsions although often at the price of unconsciousness and respiratory depression.

Chlorpromazine was chosen because it was, at the time of the trial, the most potent of a range of drugs assayed on local tetanus in rabbits (D. R. Laurence and R. A. Webster, unpublished). In addition it had been found possible to arrest clinical tetanus spasms by its sole use (Kelly and Laurence 1956, Laurence 1957).

TABLE I—COMPARISON OF GROUPS, NON-NEONATES

—	Chlorpromazine treated	Barbiturate treated
No. of cases	23	21
Average age (yr.)	18	22·5
Race:		
African	16	12
Indian	7	9
Sex:		
Male	15	13
Female	8	8
Average incubation period (days)	15*	10·5
Average period of onset (hr.)	32	30·5
Severity:		
Severe	15	13
Moderate	7	6
Mild	1	2
Site of wound:		
Leg	12	12
Scalp	3	2
Arm	3	1
Uterus	0	1
No wound found	5	5
Clinical sepsis present on admission	7	9

* This figure is high because 1 case had an apparent incubation period of 60 days.

TABLE II—COMPARISON OF GROUPS, NEONATES

—	Chlorpromazine treated	Barbiturate treated
No. of cases	14	17
Average age (days)	8	7·5
Race:		
African	13	14
Indian	1	3
Sex:		
Male	6	8
Female	8	9
Average incubation period (days)	7	5·5
Average period of onset (hr.)	18	24
Severity:		
Severe	14	17
Moderate	0	0
Mild	0	0
Site of wound (umbilicus)	14	17
Clinical sepsis present on admission	13	17

Division of Patients

Because of the high mortality-rate anticipated and feeding problems, neonates were given a modified standard treatment and the results assessed separately from the non-neontal patients. There were not enough children to make it useful to separate them as a special group.

Procedure on Admission

Immediate sedation followed by a period of quietude was considered essential so that such necessary procedures as the main antitoxin doses and tending the wound would provoke severe convulsions.

Antitoxin Dosage

This was standardised at a high level so that the same dose would be suitable for even the most severe cases. One patient, who had trodden on a nail, was found post mortem to have, deep to the tendons on the sole of his foot, an abscess which had given no signs of its presence during life. Since it is possible that this was a source of huge amounts of toxin, the antitoxin administered may have been inadequate in this case. No hypersensitivity reactions occurred.

TABLE III—DEATHS

—	Chlorpromazine treated	Barbiturate treated
Non-neonates:		
No. of cases	23	21
No. of deaths	10 (*43%*)	11 (*52%*)
Deaths among patients surviving more than 24 hr. in hospital	8 (*38%*)	8 (*44%*)
Neonates:		
No. of cases	14	17
No. of deaths	13 (*93%*)	12 (*71%*)
Deaths among patients surviving more than 24 hr. in hospital	10 (*91%*)	11 (*69%*)

Feeding

Previous experience had taught us that it is better to pass a stomach-tube unnecessarily than to leave it too late. Once difficulty in swallowing has developed, passage of the tube may soon become very difficult indeed, the disturbance of the patient is tremendous, and the tube is liable to enter the trachea. The ability of half of the non-neonates treated with chlorpromazine to swallow successfully (table IV) was striking, and we attribute this to the drug. Of the barbiturate group 30% required intravenous feeding because a stomach-tube could not be passed; this contrasts with the chlorpromazine group, where none needed intravenous therapy because of failure to pass a tube. All the neonates were fed by stomach-tube except 1 in the barbiturate group, who was fed intravenously because a tube could not be passed.

Bronchial and Oral Secretions

These were encouraged to flow out by nursing all the patients tilted head down. Oral suction was occasionally used, tracheal suction never.

General Nursing

Disturbance of the patient was avoided as much as possible. A specially allotted nurse was usually available, but she often had to care for as many as four seriously ill patients at a time. At other times this was done by an untrained nursing aide.

Oxygen

Oxygen was not used in the non-neonates, because cyanosis was not a feature except immediately after convulsions, and it never persisted after respiration had been re-established. Attempts were made to give oxygen to the neonates by nasal tube, but this provoked such vigorous spasms that it was abandoned. Oxygen tents and incubators were not available, and it is uncertain whether they would have been useful.

TABLE IV—COMPLICATIONS AND FEEDING

—	Chlorpromazine treated		Barbiturate treated	
	Survived	Died	Survived	Died
Non-neonates:	13	10	10	11
Pulmonary complications:				
Present on admission	3	2	1	2
Developed in hospital	0	2	2	7
Other important complications (excluding wound)	6	7	7	8
Feeding:				
Oral	7	5	5	0
Tube	6	2	4	2
Intravenous	0	2	1	6
Not fed (died too soon)	0	1	0	3
Neonates:	1	13	5	12
Pulmonary complications:				
Present on admission	0	1	0	1
Developed in hospital	1	7	1	8
Other important complications	1	5	5	7
Feeding:				
Oral	0	0	0	0
Tube	1	12	5	11
Intravenous	0	0	0	1
Not fed (died too soon)	0	1	0	0

Chlorpromazine

This was usually given intramuscularly. It is intensely irritant and, although this was not a problem in the non-neonates, the neonates developed extensive induration of their muscles, which must have been painful and tended to provoke spasms. Histological study after death showed necrosis of muscle at the injection sites. An attempt was made to mitigate this by diluting the solution (25 mg. or 50 mg. per ml.) with at least its own volume of saline solution, but this probably made no difference.

TABLE V—PRINCIPAL PROGNOSTIC CRITERIA

Treatment group	Average period of onset (hr.)	Average incubation period (days)
Non-neonates:		
Chlorpromazine:		
Deaths	23	15 (6/10)*
Survivals	41	15 (11/13)*
Barbiturates:		
Deaths	13	11 (9/11)*
Survivals	48	10 (8/10)*
Neonates:		
Chlorpromazine:		
Deaths	9	6
Survivals	27	8
Barbiturates:		
Deaths	10	5
Survivals	38	6

* These figures indicate the number of cases in which it was known—i.e., 6/10 = 6 out of 10 cases.
In neonates the incubation period was presumed to start at birth.

In 1 case very severe generalised convulsions were not arrested by 500 mg. of chlorpromazine given intravenously. In all the other cases the convulsions were controlled by smaller doses and were not usually thought to be the primary cause of death. It is difficult to decide exactly what causes death in tetanus.

3 non-neonates became confused, and 1 of them had a parkinsonian tremor. This was attributed to overdosage of chlorpromazine. 2 of these patients, who died, were receiving more than 1 g. of chlorpromazine daily. The 3rd, with confusion plus tremor, was receiving 600 mg. daily and recovered. A neonate died on the eleventh day after receiving chlorpromazine 360 mg. daily for several days. His tetanus was controlled. At necropsy only pulmonary œdema was found, and death was thought to be due to chlorpromazine poisoning. In 1 patient (not included in this trial) intravenous amylobarbitone 500 mg., followed by the same dose half an hour later, did not control the spasms for more than fifteen minutes after each injection. An intravenous injection of 100 mg. of chlorpromazine thirty minutes after the second dose of amylobarbitone was followed by rapid relaxation. The patient became comatose in ten minutes. It was more than twelve hours before the spasms recurred, and they remained mild for several more hours. This was considered to be due to the well-known potentiating effect of chlorpromazine on barbiturates.

Clinically chlorpromazine relaxes tetanus spasm more effectively than do barbiturates, unless the latter are given in large enough dose to cause loss of consciousness. Retention of consciousness and absence of clinical respiratory depression seem to be an advantage.

Barbiturates

The amylobarbitone-phenobarbitone combination was easily manipulated in the non-neonates, but we felt that equally good results could have been obtained with amylobarbitone alone. In the neonates phenobarbitone proved to be cumulative, and after the first two or three days as little as 30 mg. daily sometimes sufficed to keep the child well sedated. There is no doubt that a few neonates were oversedated, and that this contributed to death, but it would give a false impression of accuracy to give a figure for the incidence of this. To find the smallest dose adequate to control the convulsions without causing respiratory depression is not easy, and sometimes the latter must be accepted as the price of freedom from convulsions. Prolonged use of phenobarbitone in neonates may be undesirable because of its slow metabolism and excretion. Amylobarbitone may well be the preferable drug.

Prophylactic Antitoxin

A male African, aged 45, had 1500 I.U. of antitoxin given after multiple stab wounds. He had an incubation period of fourteen days and no premonitory symptoms. He was treated with barbiturates and died after two days.

Comparison of Treatment Groups

The more important features of the two treatment groups are compared in tables I and II. There are no statistically significant differences.

Mortality-rates (Table III)

The trial was stopped at a total of 75 cases because no statistically significant differences had emerged and because each treatment had its disadvantages. The high death-rate in the neonate chlorpromazine group may well be due to chlorpromazine poisoning. A second trial of chlorpromazine against a mixture of barbiturates and chlorpromazine was begun and will be reported later.

Since some patients survived only a few hours after admission to hospital and can hardly be said to have had any treatment, the death-rate of those surviving more than twenty-four hours in hospital is given separately.

Complications and Feeding (Table IV)

Necropsies were made on all those who died, except 1, by the department of pathology of the University of Natal and by the pathologists of the Government mortuary. The figures for complications are therefore more accurate for the patients who died than for those who recovered. Pneumonia was suspected before death in a few patients, usually neonates, whose lungs were found at necropsy to be uninfected. Chest radiographs were not taken during the stage of severe tetanus.

Although not reaching the conventional level of statistical significance, the absence of pulmonary complications in the chlorpromazine group of non-neonates is striking and may be of importance. Furthermore stomach-tubes were passed with greater ease in the chlorpromazine than in the barbiturate group. The chlorpromazine group of non-neonates needed a tube less often, and patients were able to swallow throughout the illness more often than the barbiturate group.

The " other important complications " included drug overdosage, laryngospasm, malnutrition, fractured vertebræ, bilharziasis, pulmonary tuberculosis, accidental overhydration, dagga (*Cannabis indica*) addiction, acute pyelitis, abortion, fractured skull with epilepsy, gonococcal ophthalmia, prematurity, changing from breast to artificial milk during the illness, cerebral thrombosis, jaundice, and severe nasal sepsis. It is impossible to assess the part some of these played in the patients who died. Convulsions are not the immediate cause of death in tetanus as often as is commonly assumed. Necropsy is not so helpful as could be hoped. It is possible that direct action of the toxin on the vasomotor and respiratory centres is the most important factor.

Tracheotomy

It is generally agreed that pulmonary complications are an important cause of death in tetanus; and in this trial, in which no tracheotomies were done, the development of pneumonia, after treatment had begun, was common in all except the chlorpromazine-treated non-neonates, among whom, despite oral feeding in half the cases and the use of a stomach-tube in most of the remainder, there were only two cases of pneumonia after admission to hospital.

There were three reasons why it was decided only to do tracheotomy on patients if and when conclusive indications appeared:

(1) There is no proof that tracheotomy improves the prognosis, whereas it certainly complicates management.

(2) It carries its own complications. Forbes and Auld (1955) did tracheotomy on 10 patients, in 7 of whom mediastinal emphysema, atelectasis, or pneumonia developed. 5 of their patients required bronchoscopy, 3 of them more than once.

(3) The prospect of doing tracheotomy on seriously ill children, often aged less than 1 week, was sufficiently alarming to be avoided in the absence of conclusive evidence of its value.

Looking back over the series we feel that tracheotomy would have been desirable at least in cases where laryngospasm developed, but these were few (3) and unpredictable. The suggestion that tracheotomy is obligatory in patients fed orally or by stomach-tube is

certainly reasonable, and it is hoped to obtain evidence on this matter in a later trial. The tendency of neonates to regurgitate probably renders tracheotomy (and intravenous feeding) especially necessary in that group. We are disinclined to accept this indication absolutely because tetanus is common in areas where technical facilities are comparatively few, and overloading the essential schedule of treatment with conceivably unnecessary tracheotomy is to be avoided if possible. Routine intravenous feeding is even more impracticable. The practice of routine tracheotomy in centres specially experienced in treating respiratory disease and poliomyelitis, and where tetanus is only occasionally met with, is as justified as routine tracheotomy in this series would have been unjustified.

Laryngospasm

Severe laryngospasm provoked by stimulation (passage of a nasal tube or an injection) developed in 3 cases, all in the barbiturate non-neonate group. 2 of the patients died, apparently as a result. In both of these sedation was manifestly inadequate, but the surviving patient appeared to have been well sedated.

Sudden Arrest of Respiration

This happened thrice in 1 non-neonate (an Indian male aged 7 years), and manual artificial respiration was followed by return of spontaneous respiration in a few minutes on the first two occasions. The third occasion was fatal.

Similar repeated respiratory failure developed in 3 neonates who died and in 1 who survived. Since neither respirators suitable for neonates nor the staff to manage them were available, the question of whether to use continuous artificial respiration with or without neuromuscular block did not arise. It is impossible to say how often patients who died would have started breathing again, at least temporarily, if someone had been at hand to give artificial respiration. Of the 5 patients who had more than one attack of respiratory failure, 4 were treated with barbiturates and 1 with chlorpromazine. Respiratory stimulants (nikethamide, bemegride) were given as well as artificial respiration, without apparently making any difference. Periods of gasping respiration were common before death in the neonates.

Prognostic Criteria (Table V)

The period of onset is the most important criterion of prognosis. The incubation period is unreliable because the time of wounding (or birth) from which it is calculated may not be the time of infection, and because there are patients in whom no attributable wound is found. It is usually considered that a period of onset of less than forty-eight hours carries a serious prognosis. In all our groups the average period of onset was forty-eight hours or less, indicating that the tetanus was usually very severe. Some patients denied any symptoms before the onset of reflex spasms. However, death and survival were by no means closely related to the duration of the period of onset. 9 non-neonates with periods of onset of less than twenty-four hours survived. It is not rare to read reports of a few, or even single, cases of tetanus in which it is stated that the patient would have died because of a short incubation period or period of onset, and that survival must be attributed to the treatment given. Such claims are unacceptable because these prognostic criteria are only general guides and give no certain information on the outcome of an individual case. Tetanus does not differ from other infections in that properly designed clinical trials are necessary if the value of a treatment is to be determined with the greatest economy of lives.

Comparisons of mortality figures between one published series of tetanus and another are also liable to be misleading because, for example, the quality of the nursing may well be more important than the drugs used. Reports of single cases are only of value in describing new techniques; they give no conclusive proof of the efficacy of a treatment. There have been reports of administration of chlorpromazine to tetanus patients dating from its introduction into anæsthetic practice in combination with pethidine and promethazine. The specific tetanus anticonvulsant action does not seem to have been suspected at first, with the result that small doses were given and chlorpromazine was never used alone, which is the only way of evaluating it. In fact phenothiazine compounds are the most potent available substances which may arrest tetanus spasms without significantly depressing respiration or consciousness (D. R. Laurence and R. A. Webster, unpublished). It remains to be seen what part these drugs will play in the treatment of tetanus, because it is by no means certain that mere control of convulsions together with prevention of pneumonia will ensure survival in all cases.

Summary

A clinical trial was made on 75 tetanus patients allotted at random to two treatments practised concurrently.

Chlorpromazine and barbiturates, when used as described, cause no statistically significant difference in the outcome of tetanus.

Chlorpromazine is easier to manage than barbiturates because it controls tetanus convulsions without causing loss of consciousness or clinically noticeable respiratory depression.

We thank Dr. D. D. Reid for advice on the design of the clinical trial as well as for preparing the envelopes with which the patients were randomised; Dr. S. Disler, medical superintendent, King Edward VIII Hospital, Durban, for facilities for the clinical trial; and Maybaker Pty. for a gift of chlorpromazine. Dr. D. R. Laurence visited the department of medicine of the University of Natal in 1956 with a grant from the Wellcome Trust.

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EFFECT OF CHLORPROMAZINE ON MUSCLE SPASM IN HUMAN TETANUS

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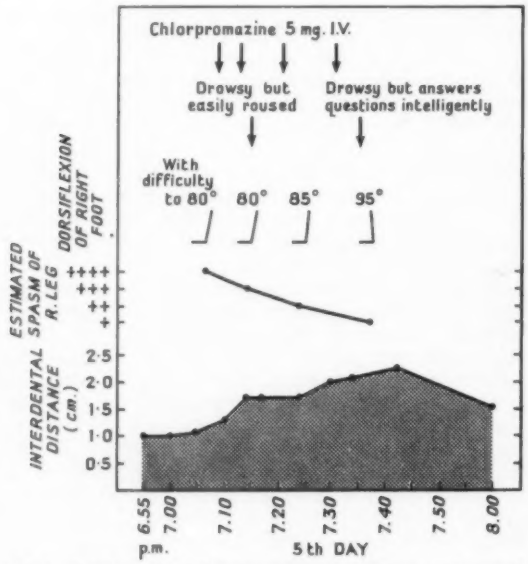
TETANUS may be general, local, or a combination of both. In man local tetanus is relatively uncommon, but it is readily produced experimentally. Hougs and Andersen (1954) and Kelly and Laurence (1956) studied the effect of drugs of possible therapeutic value on the muscle spasm of local tetanus in the rabbit. Since chlorpromazine showed promise it was given to patients with general tetanus. Kelly and Laurence, in their successful treatment of a child, used it alone to combat the spasms; they discuss its probable mode of action. Other workers have combined chlorpromazine with depressants of the central nervous system and with neuromuscular blocking agents, but opinion differs about the value of chlorpromazine.



Effect of intravenous chlorpromazine on trismus and muscle spasm of right leg. (See text for explanation of terms and symbols used in diagram.)

I report here a case of tetanus with mainly local manifestations because chlorpromazine immediately and unequivocally reduced the muscle spasm.

Case-report

A girl, aged 11 years, injured her foot on some old wood on Feb. 2, 1957. The wound suppurated, and on Feb. 17 trismus developed. Late on Feb. 18 she was admitted to hospital, complaining only of trismus and hunger. She denied stiffness of either leg or any other symptom. Her previous health had been excellent, and she had not been actively or passively immunised against tetanus.

On examination she looked well and was apyrexial, but could not separate her teeth more than 1 cm.—attempts to do so decreased this distance. There was a suppurating puncture wound on the medial side of her right sole. Muscle spasm held her right foot in inversion and plantar flexion, and her right knee was flexed. Both knee- and ankle-jerks were exaggerated, with poorly sustained clonus, more especially on the right. Her left leg was otherwise normal. Her arm, abdominal, and plantar reflexes were normal, and the rest of the clinical examination was negative.

Treatment and Progress

Treatment began with antitetanus serum, wound toilet under general anæsthesia, penicillin, and intravenous infusion. Sodium phenobarbitone gr. 2 at 2 A.M. and gr. 3 at 7 A.M. was given intramuscularly, and phenobarbitone gr. 1 was given orally thrice during that day. The patient became deeply sedated though rousable for fluid feeds, but by evening the trismus and spasm of her right leg had worsened. Phenobarbitone was stopped and a trial of chlorpromazine started, the interdental distance—i.e., the distance in centimetres between the edges of the incisors when the patient opened her mouth as widely as possible—being used as a measure of its efficacy.

The first dose (at 6 P.M. on third day of illness) had a dramatic effect. Before treatment with chlorpromazine the interdental distance had been 1 cm. and the knee-jerks exaggerated (examination was limited because it made the spasm worse). Immediately after the slow intravenous injection of chlorpromazine 20 mg. the interdental distance was 2·5 cm., increasing after six minutes to 3 cm. Tendon-reflexes and limb spasm disappeared, and the patient became sleepier but still easily rousable. Her respirations, pulse-rate, and blood-pressure were unchanged. At midnight she was rousable, but her jaw and right leg were still relaxed and knee-jerks absent; but by 9 A.M. trismus, spasm of her right leg, and exaggeration of her knee-jerks had returned. Liquids only had been taken that morning. Chlorpromazine 10 mg. increased the interdental distance to 1·9 cm. and made the patient drowsy. At 2 P.M. the interdental distance was 1·5 cm., the reflexes were normal, and she had just eaten a three-course lunch. By 4 P.M. trismus, &c., had returned, but chlorpromazine 5 mg. reduced it as before. It had been noted that day that, if one tried to dorsiflex her right foot, spasm worsened and opposed the movement (response to stretch), but by 10 P.M. light touch on her right foot elicited a violent painless convulsive "withdrawal" movement characterised not only by contraction of the inverter and plantar flexor muscles of the foot and of the hamstring muscles but also by palpable contraction of the quadriceps muscle. The patient had not noticed this convulsive movement occurring spontaneously but she felt the limb "stiff" for the first time that day. The severity of limb spasm could now be recorded in two ways: (1) the estimated angle from the horizontal to which the right foot could be dorsiflexed (the left foot could be dorsiflexed to 95°); and (2) the degree of reflex spasm, which was arbitrarily graded as follows (in the diagram the symbols are shown vertically):

++++ Violent "withdrawal" spasm (as described above) on lightly touching the toes of the right foot.
+++ Similar spasm elicited if foot touched more firmly.
++ Plantar flexion present and increased on dorsiflexing foot.
+ Increased tone compared with left limb.

In the accompanying figure the effect of intravenous chlorpromazine on trismus and limb spasm is shown diagrammatically. This pattern of response is typical of that regularly obtained during the fifth and sixth days of the disease. Chlorpromazine 20 mg. reduced trismus for five or six hours and limb spasm for a variable but shorter period.

On the sixth day thiopentone 50 mg., given two hours after chlorpromazine 20 mg., reduced considerably further, for a few minutes, trismus and limb spasm, though consciousness was unimpaired—the child was eating lunch five minutes later. This effect was confirmed twice.

On the seventh day substitution of chlorpromazine 50 mg. six-hourly for intravenous chlorpromazine was begun, and treatment with phenobarbitone (gr. 1 six-hourly) was started again. When phenobarbitone was withheld on the tenth day, the patient's improvement continued for twenty-four hours; then the spasm increased, requiring twice as much chlorpromazine to control it. Until the thirteenth day any disturbance, such as the entry of students or visitors, had increased the trismus and limb spasm. Since on that day it did not, and since the interdental distance was 3 cm., with no appreciable limb spasm, chlorpromazine was withheld, and the child was moved to the main ward. The spasm immediately returned, especially that of the limb; therefore treatment with chlorpromazine 100 mg. six-hourly was resumed for forty-eight hours, when the spasm again became minimal. On the seventeenth day the patient got up, but the increased tone in the calf caused her to walk in equinus for two days. When she was discharged on the nineteenth day, her interdental distance was 2·8 cm. Six weeks later it was 4·3 cm. and she was clinically normal.

During treatment there was no complication, and frequent examinations of the blood and urine showed no evidence of jaundice or of depression of the bone-marrow.

Discussion

In this child the limitation of muscle spasm to the jaw and one leg facilitated study of the effect on it of drugs and disturbance. I do not suggest that the methods

described will be useful for assessing ordinary clinical response, because usually it is undesirable to stimulate the patient in this way. This child had an excellent prognosis, and recovery was probable even without any sedative or antispasmodic therapy. Nevertheless there is no doubt that chlorpromazine modified the spasm and, by relieving her trismus, enabled her to eat a normal diet, and she remained conscious. Full phenobarbitone sedation had provided neither advantage. A further, though hypothetical, benefit might have been the minimising of contracture—a recognised sequel to local tetanus (Millard 1954). In experimental local tetanus the early reflex or " hypertonic " contraction, which can be abolished by section of the nerve, deep anæsthesia, curarisation, &c., is succeeded in four or five days by " myostatic contracture ". This is unaffected by any of the measures mentioned above, but may recover spontaneously in from four to eight weeks (Ranson and Ranson 1929). Its cause is unknown; but, since it is always preceded by reflex spasm, perhaps the spasm in some way damages the muscle, leading to " myostatic contracture ". If this were so, the reduction of early spasm by suitable drugs, as was done intermittently in the present case, might minimise subsequent contracture and so shorten disability. In this child the time taken for clinical recovery of the muscles compares favourably with the much longer periods—up to several months—reported by some workers (see Millard 1954).

The effect of the initial dose of chlorpromazine, given during deep phenobarbitone sedation, was never matched by subsequent and larger doses; and thiopentone, given during the period of action of chlorpromazine, temporarily but considerably increased the interdental distance. These facts suggest that a combination of phenobarbitone and chlorpromazine, as used by Cole and Robertson (1955), might be superior to chlorpromazine alone. This theory was not tested by parenteral dosage, but the response to the combination given orally seemed to favour it. No conclusion, however, was reached.

Summary

An unusual case of tetanus is reported in which it was possible to measure roughly the effect of drugs and disturbance on spasm.

Full sedative doses of phenobarbitone did not relieve the spasm, but chlorpromazine did.

I am grateful to Prof. D. M. Douglas for allowing me to assist in the treatment of his patient and to publish this case. I was in receipt of a grant from the Scottish Hospital Endowment Research Trust.

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" A young lady keeps her bed for two or three years for an affection of the hip, and is seen by all the leading men in London. One day the clergyman walks in, prays over her, and she gets up and walks. The case is reported in all the religious journals as a miracle, whereupon the doctors all join in declaring that the case was one of hysteria, and that there was nothing the matter with her. Then, I would ask, why was that girl subjected to local treatment and to the infliction of physic every day for years? Why did not the doctors do what the parson did? "—Sir SAMUEL WILKS. *Lectures on Diseases of the Nervous System.* London, 1878; p. 374.

ISOLATION OF TRACHOMA VIRUS IN EMBRYONATE EGGS

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THE laboratory cultivation of trachoma virus has long been attempted by different workers, but claims to success (Machiavello 1944, Stewart and Badir 1950, Poleff 1950, 1954) have not been confirmed. The expert committee on trachoma of the World Health Organisation (1956) was not convinced that the cultivation of the virus had been achieved in series or in quantity.

T'ang et al. (1957), however, in China, made three isolations of a virus from patients with trachoma by inoculating conjunctival material into the yolk sacs of 6–8-day embryonate eggs. The egg-cultured virus produced a follicular conjunctivitis in rhesus monkeys, in one instance with inclusion bodies. Various animal and other tests distinguished the virus from hitherto described viruses, in particular those of psittacosis and lymphogranuloma, which it resembled morphologically.

Our preliminary results recorded here have confirmed the findings of the Chinese workers with the isolation of a morphologically and serologically similar virus from patients with trachoma in the Gambia, and have identified it as the causal agent of trachoma by inoculation of a human subject.

The Chinese Virus

Dr. T'ang kindly supplied us with freeze-dried samples of his strains of virus, which were brought from Peking in September, 1957, by Prof. E. T. C. Spooner. Strains TE8 (13th egg passage) and TE55 (8th egg passage) were revived without difficulty in the yolk sacs of 8-day embryonate eggs incubated at 35°C as recommended by T'ang. In general we confirmed the original morphological description of the virus; its lethal effect on chick embryos, however, was not so constant as reported by T'ang. Both strains have now undergone 6 egg passages at the Lister Institute. After 2 egg passages three young rhesus monkeys were inoculated with strain TE55 by the conjunctival route. Two monkeys developed follicles in the upper fornix of the inoculated eye on the 8th and 20th days. The follicles persisted for about 8 weeks, the control eyes remaining normal throughout. Although cytoplasmic inclusions were occasionally found in scrapings from the infected conjunctivæ they were never typical of the classical Halberstaedter-Prowazek (1907) bodies.

Isolation of Virus from Trachoma Patients in the Gambia

Our viruses were isolated by methods similar to those of T'ang et al. (1957). To avoid any possibility of confusion, live Chinese virus was never sent to the West African laboratory.

Method of Isolation

Material was taken from patients in whom typical trachoma inclusions had recently been found. The upper lid was everted and rubbed with a swab moistened with 10% broth-saline. The swab was placed in broth-saline 0·5 ml. which contained streptomycin 500 μg. to inhibit bacterial contaminants, and held for an hour at 4°C. (Penicillin was not used, because the Chinese workers

reported it to be antiviral.) The fluid, including that squeezed from the swab, was used to inoculate 2-day, 5-day, or 6-day embryonate eggs by the yolk-sac route. Viruses closely resembling the Chinese strains were isolated from 10 trachoma patients. They were freeze-dried as crude yolk-sac homogenates in 2·5% peptone and sent by air-mail to the Lister Institute. The following notes illustrate a typical isolation:

Case 1.—A Mandingo girl, aged 8 years, was examined on May 20, 1957, with the slit-lamp by Mr. M. Gilkes, who reported trachoma III, follicles +, papillæ + + +, scarring +, well-developed 5-mm. pannus, and slight corneal infiltration in advance of pannus. No inclusions were found in conjunctival scrapings.

On Nov. 20 she was Frei-test negative after 48 hours.

On Nov. 27 inclusions were found in conjunctival scrapings, and conjunctival material was injected into two eggs.

On Dec. 6 one embryo died. A yolk-sac smear stained by Castañeda's method showed numerous elementary bodies.

This strain of virus, designated G1, was passaged four times in eggs before dispatch to the Lister Institute (see table). It has now undergone ten yolk-sac passages made by inoculating the yolk sacs of 6–8-day embryos with

INITIAL EGG PASSAGES OF STRAIN G1

Passage no.	No. of embryos inoculated	No. of specific deaths	Days after inoculation on which embryos died
1	2	1	9
2	6	5	8, 8, 8, 9, 9
3	7	5	4, 4, 4, 4, 6
4	9	8	4, 4, 5, 5, 6, 6, 6, 6

0·25 ml. of 20% suspensions of infected yolk sac in 10% broth-saline.

Morphology and Staining Reactions

Morphologically the Chinese and the Gambian strains of virus are very similar. Smears from infected yolk sacs contained numerous elementary bodies staining red by Machiavello's method, and blue with Castañeda stain. Giemsa-stained particles ranged in size from 0·2 to 0·5 μ, the smaller staining pink and the larger blue or purple. Most forms were round, and some slightly elongated. They occurred singly or in aggregates, mostly extracellularly. Some intracellular forms were present, usually as large purple granules, sometimes as big as 1 μ in diameter. In one yolk sac infected with a Gambian virus numerous yolk cells were packed with virus particles which stained characteristically with Giemsa and with Castañeda; in this instance the embryo survived, and the yolk sac was removed shortly before hatching was due.

Electron Microscopy

Viruses from the 16th egg passage of Chinese strain TE8 and from the 8th egg passage of strain G1 were purified by differential centrifugation and treatment with 'Arcton 63' (1:1:2 trichloro 1:2:2 trifluoroethane) by a method similar to that of Gessler et al. (1956).

Electron microscopy revealed objects strikingly similar to the elementary bodies of other members of the *Chlamydozoaceæ* (Rake 1947, Heinmets and Golub 1948, Gaylord 1954). In the electron micrographs (fig. 1a and b) the collapsed desiccated bodies measure 0·3–0·4 μ. Rather larger forms, not shown here, were also seen. No such bodies were found in an extract of normal yolk sac similarly prepared, and it is highly probable that they represent the virus.

Action of Virus on Chick Embryos

Although a heavy inoculum of virus usually killed embryos in 4–11 days, this was not the rule, and living

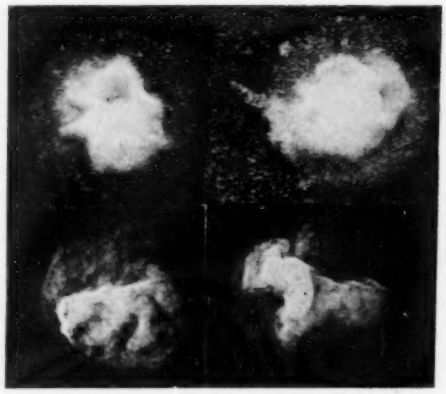


Fig. 1—Electron micrographs (×67,000) of virus-like bodies in purified suspensions of (a) strain TE8 and (b) strain G1.

embryos examined just before hatching sometimes had numerous elementary bodies in the yolk sac. Embryos dying after infection usually, but not always, had petechial hæmorrhages in the skin and intense congestion of the liver and kidneys but apparently a normal spleen. In only 2 of 12 embryos dying after infection with strain TE8 were virus-like particles found in smears of the viscera: in one they were present in the skin, brain, spleen, liver, lung, and kidney, but in the other only in the skin.

Serological Investigations

The serology will be reported in detail elsewhere. Direct and cross-tests by complement fixation with sera from lymphogranuloma patients and from Frei-negative trachoma patients, against the psittacosis-lymphogranuloma group antigen and against antigens prepared from strains TE8, TE55, and G1 revealed a very close relationship between all four antigens.

Bacteriological Tests

Yolk-sac suspensions infected with both Chinese and Gambian strains of virus have been repeatedly seeded into various culture media, including those suitable for the growth of brucella and pleuropneumonia-like organisms. Incubation under various conditions of temperature and atmosphere consistently failed to induce bacterial growth.

Inoculation of Man

Discussing the criteria for identification of a cultured virus as the cause of trachoma the World Health Organisation (1956) stated:

"In all cases the final proof should be the production of typical trachoma in human volunteers after sufficient passages in culture to eliminate the dilution factor. Although the committee deplores the necessity for human inoculation (not at present a dangerous procedure in view of effective chemotherapy) it insists that this criterion be fulfilled, as at the present time experimental trachoma cannot be diagnosed with certainty in hosts other than man."

It was deemed advisable to use a blind man for such an experiment, to avoid any possible risk to sight. On March 11, 1958, such a volunteer was inoculated with strain-G1 virus from the 8th egg passage. At this passage the original inoculum had been diluted about 10^{17} times.

The blind volunteer was a white man, aged 71, whose right and left eyes were enucleated in 1955 and 1957 respectively after phaco-anaphylactic endophthalmitis. Before inoculation the conjunctivæ of the sockets were not inflamed, though both were producing a slight mucopurulent discharge. After the

instillation of 4% cocaine drops the upper lids were everted; the tarsal conjunctiva and the fornix of the left eye were rubbed firmly with an eye swab soaked in a 20% suspension of infected yolk sac in broth-saline. The right eye was similarly treated with a 20% suspension of normal yolk sac (day 0). The man was next seen on day 7 and was examined at intervals thereafter with a slit-lamp.

Clinical observations.—On day 7 he complained of soreness of his left socket, first noted on day 2. His right socket appeared unchanged and remained so thereafter except for slight hyperæmia (which appeared on day 17) of the lower-lid conjunctiva. His left socket had a fairly profuse purulent discharge, and the entire conjunctiva was intensely congested, œdematous, and infiltrated. His preauricular glands were neither palpable nor tender. On day 10 he was not complaining, and his left socket was rather less congested. On day 14 he had considerable papillary hyperplasia of the entire conjunctival surface of his left socket. On day 17 there was increased discharge from his left socket, with increasing cellular infiltration. On day 21 the conjunctiva of his left lower lid appeared granular, owing to small opaque foci, probably early follicles. His left preauricular gland was just palpable and slightly tender. On day 28 there was increased infiltration of the entire conjunctiva; otherwise there was no change since the last examination. The left preauricular gland was no longer palpable or tender.

Laboratory investigations.—Cultures made on days 7, 17, and 21 yielded *Corynebacterium xerosis* from both sockets. On day 17 two colonies of micrococci were grown from the left socket. Examination of the volunteer's blood gave the following initial values: Hb 16·6 g. per 100 ml., packed cell volume 49%, white cells 9000 per c. mm. (polymorphs 63%, lymphocytes 33%, monocytes 4%), erythrocyte-sedimentation rate (Wintrobe) 10 mm. in 1 hour. These values remained substantially unchanged except for an increase in the proportion of polymorphs to 66% on day 14, and a rise in total white-cell count to 11,800 per c. mm. on day 21. Conjunctival scrapings were taken at each examination, and stained with iodine followed by Giemsa-May-Grünwald or by the latter stain only. Scrapings from the right (control) conjunctiva contained only normal epithelial cells and moderate numbers of polymorphs. From day 7 onwards scrapings from the left conjunctiva contained numerous polymorphs; on days 7 and 10 there were moderate numbers of lymphocytes, plasma cells, and large mononuclear cells. The last three cell types became more numerous from day 14 onwards. The epithelial cells often showed vacuolation of the cytoplasm, particularly near the nucleus, and distortion of nuclear structure. On day 7 numerous particles were seen resembling elementary bodies, mostly extracellular but sometimes within the cytoplasm of the epithelial cells. These bodies became progressively more scanty and were not seen after day 14. On day 7 a few initial bodies were seen in epithelial cells, and there were also very scanty but typical Halberstaedter-Prowazek bodies. The presence of a carbohydrate matrix in the latter was proved by staining with iodine (Rice 1936, modified by Gilkes et al. 1958), and the typical granular structure demonstrated by subsequent decolorising with alcohol and restaining with Giemsa-May-Grünwald (fig. 2a and b). Initial body forms and Halberstaedter-Prowazek bodies (fig. 3) became progressively more numerous until on day 21 there were often several visible in a single high-power field. On day 14 material was inoculated into three chick embryos, one of which died with characteristic hæmorrhagic lesions 8 days later. A yolk-sac smear showed numerous elementary bodies identical with those previously described.

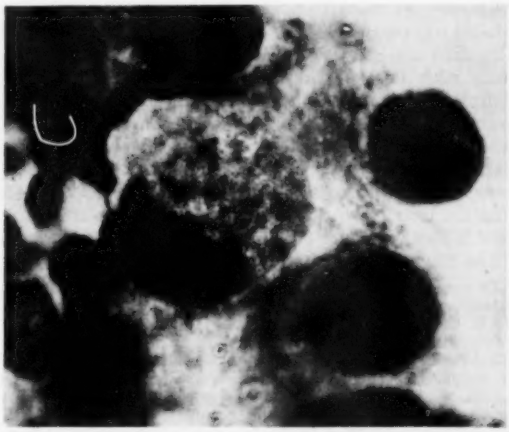
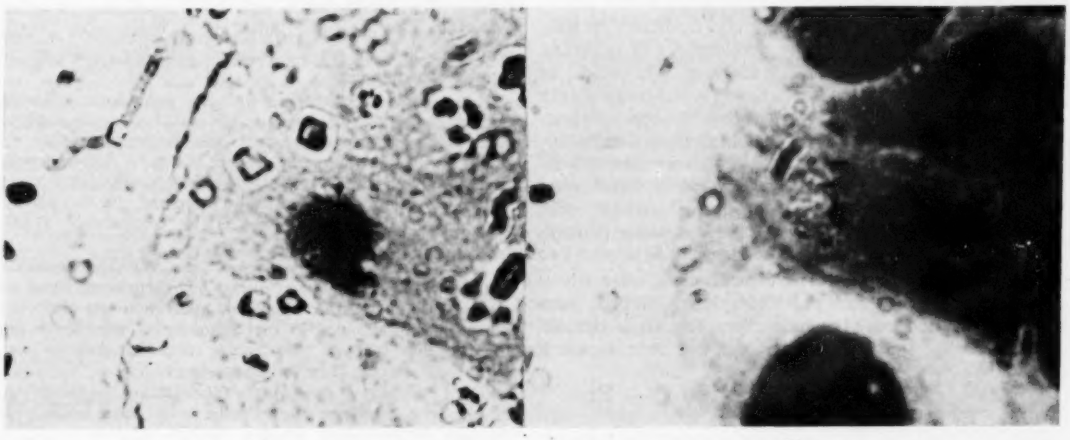


Fig. 3—Conjunctival scraping from volunteer inoculated with strain G1: note epithelial cell containing large inclusion which fills cytoplasm and distorts nucleus. (Giemsa-May-Grünwald ×1820.)

Comment

Our experiments confirm the Chinese workers' findings that a virus resembling those of the psittacosis-lymphogranuloma group can be isolated from trachoma cases by yolk-sac inoculation. Our electron microscopy and serological tests provide additional evidence of its



(*a*) (*b*)

Fig. 2—A Halberstaedter-Prowazek body in conjunctival scraping from volunteer inoculated with strain G1: (a) stained with iodine to show the conjunctival matrix (angular bodies are crystals of iodide); (b) decolorised and restained with Giemsa-May-Grünwald to show typical location and structure.

relationship to this group. Inoculation of a human being induced conjunctival lesions closely resembling those seen in the early stages of natural trachoma and typical inclusion bodies with a carbohydrate matrix. Except for inclusion blenorrhœa, inclusions of this kind occur only in trachoma. Since the virus was originally isolated from a trachomatous patient with definite corneal involvement, we consider that these preliminary results constitute a reasonable proof that the strain G1 is a trachoma virus.

At the time of writing, the human inoculation experiment is still in progress. These and other investigations will be reported in greater detail elsewhere.

We are greatly indebted to Sir Stewart Duke-Elder for his interest and advice and for his assistance with the human inoculation; and to Mr R. C. Davenport and Mr. B. Jones for help in this connection. We thank Dr. F. F. T'ang for the strains of Chinese virus; Mr. M. Gilkes for information about the case of trachoma in the Gambia; Dr. R. Valentine for the electron micrographs; Dr. P. Schofield for bacteriological and hæmatological investigations of the volunteer; and Prof. C. F. Barwell for lymphogranuloma serum and antigen. Mr. I. Barnett and Miss M. Fischer gave valuable technical help. Our particular thanks are due to the anonymous volunteer who submitted so willingly to the discomfort of the inoculation test.

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DIETARY RESTRICTION AND COAGULABILITY OF THE BLOOD IN ISCHÆMIC HEART-DISEASE

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IT has been supposed that the intake of dietary fat may be a determining factor in the development of ischæmic heart-disease; the present investigation was made to discover any change, on a low-fat diet, in the coagulability of the blood of patients with ischæmic heart-disease. Increased coagulability of the blood in respect of thromboplastin-generation, platelet-stickiness, fibrinogen-estimation, and prothrombin-time (Russell's-viper venom) has previously been shown in a group of patients with ischæmic heart-disease compared with healthy controls (McDonald 1957, McDonald and Edgill 1957).

Thirty-four patients with ischæmic heart-disease, whose blood coagulability had previously been studied, were further investigated. In some there had been demonstrable cardiac infarction in the past, but in none was it recent.

Methods

Diet.—Half the patients were treated with a low-fat diet which was similar to that previously described by Kempner (1944); details are given in appendix A.* The remaining half of the patients were instructed not to alter their diet. All patients were given a daily vitamin-supplement, consisting of vitamin A 5000 units, vitamin D 1000 units, aneurine hydrochloride 5 mg., riboflavine 5 mg., nicotinamide 20 mg., and calcium pantothenate 2 mg.

Selection.—The selection of the patients with ischæmic heart-disease for diet and non-diet groups was carefully controlled; details are given in appendix B. The patients taking the low-fat diet were aged 45–62 (average 56); the remaining patients were aged 45–59 (average 51).

Blood-coagulation.—The following tests were made: thromboplastin-generation test, platelet-count, estimation of platelet-stickiness, fibrinogen estimation, and prothrombin-time (Russell's-viper venom, ' Stypven ').

Procedure.—Blood-coagulation was examined in the diet-patients before they began the diet (estimation 1), after 4–5 weeks on the diet (estimation 2), and 6–7 weeks after stopping the diet (estimation 3). The blood-coagulation of those who were not being treated with diet was studied at similar intervals.

Technical Details

All tests of blood-coagulation were performed as previously described in detail (McDonald and Edgill 1957), except for the following modifications:

Estimation of platelet-stickiness.—The glass bulb had no window, and platelet-counts were taken at 20 and 40 minutes.

Thromboplastin-generation test.—This test was performed as previously described for " group 2 " (McDonald and Edgill 1957) Clotting-times were taken at intervals of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 minutes. The same chloroform extract of brain was used as in the previous " group 2 ", and the same dilution curve.

Prothrombin-time.—The Russell's-viper venom (' Stypven ') was made up in 5 ml. amounts and stored for up to 3 days at 2°C.

Total serum-cholesterol.—This was estimated by the method of Myers and Wardell (1918), except that a small Soxhlet apparatus was used instead of the special extraction apparatus described.

Urine-sodium.—This was estimated by flame-photometry on a 24-hour specimen of urine.

Results

Weight.—All diet patients lost weight while on the diet; so this must be a genuine effect, though in particular comparisons between the non-diet and diet groups the differences were not statistically significant.

Coagulation tests in diet and non-diet patients.—The results of the coagulation tests were compared in three different groups of diet and non-diet patients. The first group consisted of matched individuals; the second was related to the thromboplastin-generation test, which was repeated at the start of the study; and in the third the results of the coagulation tests on six patients, in whom there was a severe reduction of the 24-hour urine sodium while on the diet, were compared with the results in the whole non-diet group.

First method of comparison (matched individuals).—Various patients defaulted for various reasons, such as death, inability to attend hospital regularly, and, later, failure to maintain the diet, after being assigned to the diet group. A non-dieter was therefore excluded for each dieting defaulter (and vice versa) before the groups were statistically compared. Six diet patients and six non-diet patients were left for comparison. Details are given in appendix C.

Second method of comparison (mean thromboplastin).—Patients with ischæmic heart-disease have here been considered on the basis of the thromboplastin-generation test performed when they re-attended at the beginning of the experiment. Twelve diet patients and twelve non-diet patients were compared. Details are given in appendix C.

Third method of comparison (low-sodium patients).—An effect of the Kempner rice-fruit diet is to reduce severely the 24-hour urine-sodium; six diet patients achieved a level of 8·7 mEq. per litre or less. These patients, who may therefore be guaranteed to have maintained the diet rigidly, were compared with the whole non-diet group.

* A multigraphed copy of the appendices may be had on application to the Editor, *The Lancet*, 7, Adam Street, London, W.C.2.

TABLE I—RESULTS OF COAGULATION TESTS BEFORE AND AFTER DIET: FIRST METHOD OF COMPARISON (MATCHED INDIVIDUALS)
Figures are means of 6 observations

—	Platelets (per c.mm. whole blood)	Platelet stickiness (% of initial count)		Weight (lb.)	Prothrombin (stypven) time (sec.)	Fibrinogen (mg. on 2 ml. plasma)	Peak thrombo-plastin (%)	Serum-cholesterol (mg. per 100 ml.)
		20 min.	40 min.					
Estimation 1:								
Non-diet	231 (s.e. 24)	57·6 (s.e. 3·4)	38·9 (s.e. 3·3)	155 (s.e. 8)	14·5 (s.e. 0·7)	0·078 (s.e. 0·087)	121·3 (s.e. 3·0)	285 (s.e. 22)
Diet	265	60·1	45·1a	153	14·3	0·074	119·3	283
Estimation 2:								
Non-diet	237 (s.e. 26)	59·3‡ (s.e. 1·9)	40·6† (s.e. 3·5)	154 (s.e. 8)	16·3 (s.e. 1·4)	0·075 (s.e. 0·071)	118·5 (s.e. 3·4)	283† (s.e. 21)
Diet	288	71·5‡	55·2†	142	17·1	0·069	120·2	214†
Estimation 3:								
Non-diet	248 (s.e. 27)	61·9‡ (s.e. 3·8)	44·7‡ (s.e. 2·3)	151 (s.e. 7)	—	0·071 (s.e. 0·051)	118·8 (s.e. 4·7)	256 (s.e. 21)
Diet	281	74·8‡	58·6‡b	143	—	0·064	113·8	256

Estimation 1, at start of test; estimation 2, 4–5 weeks later; estimation 3, after further 6–7 weeks.
s.e., standard error of difference. a, mean of 5 observations; b, mean of 4 observations.
Differences between means are not statistically significant, unless indicated: †, significant at 1·0% level; ‡, significant at 0·1% level. •, significant at 5·0% level.

The results of the coagulation tests are given in tables I–III. The averages for each test are given, before the diet was begun (estimation 1), after an interval of 4–5 weeks during which half the patients were treated with diet (estimation 2), and 6–7 weeks later—i.e., 6–7 weeks after those who were on the diet had discontinued it (estimation 3).

Statistical Analysis

The statistical analysis was separately made for each method of comparison (first, second, and third). The significance has been tested of the differences in the mean values (given in tables I, II, and III) between each diet and non-diet group, and between the three diet groups. A " t " test was used for each diet and non-diet group, while each set of three diet groups was tested by a between-group and a within-group analysis of variance. To allow for any reduction in error that might have been made by the careful allocation of cases to treated and control groups, the peak thromboplastin percent score before the study started was used as a concomitant variable, and covariance was analysed. In most instances this made no difference (slopes were not significant); occasionally (e.g., serum-cholesterol) a slight, but significant, reduction in error was obtained.

A statistically significant difference was found in certain tests, between diet and non-diet patients, in estimations 2 and 3. These differences were always found in the same tests, in all three methods of selection for comparison. Statistically significant differences were also found, in most cases, between the three estimations for the group on the diet. In the first method of comparison (table I) a statistically significant difference (reaching the 0·1% level) was found between non-diet and diet patients in estimations 2 and 3, with regard to the 20-minute platelet-stickiness test; in the 40-minute stickiness test significance reached the 1·0% level in estimation 2, and the 0·1% level in estimation 3. In the first method of comparison the serum-cholesterol was significantly different (at the 1·0% level) in estimation 2. A statistically significant difference was found in the second method of comparison (table II) for the 20-minute platelet stickiness test in estimations 2 and 3 (at the 0·1% level), for the 40-minute platelet-stickiness test in estimation 2 (at the 0·1% level), and for the 40-minute platelet-stickiness test in estimation 3 (at the 1·0% level). The serum-cholesterol difference was significant in estimation 2 (at the 0·1% level). In the third method of comparison (table III) the differences with regard to platelet-stickiness were the same as in the first (matched individuals), the serum-cholesterol difference was significant in estimation 2 (at the 0·1% level), and in addition a statistically significant difference was found in the total platelet count on whole blood in

TABLE II—RESULTS OF COAGULATION TESTS BEFORE AND AFTER DIET: SECOND METHOD OF COMPARISON (MEAN THROMBOPLASTIN)
Figures are means of 12 observations

—	Platelets (per c.mm. whole blood)	Platelet stickiness (% of initial count)		Weight (lb.)	Prothrombin (stypven) time (sec.)	Fibrinogen (mg. on 2 ml. plasma)	Peak thrombo-plastin (%)	Serum-cholesterol (mg. per 100 ml.)
		20 min.	40 min.					
Estimation 1:								
Non-diet	238 (s.e. 20)	60·4 (s.e. 2·3)	42·0 (s.e. 2·4)	157 (s.e. 6)	14·4 (s.e. 0·4)	0·075 (s.e. 0·049)	117·0 (s.e. 2·4)	297 (s.e. 17)
Diet	254	59·3	42·7a	157	14·4	0·076	120·4	298
Estimation 2:								
Non-diet	233 (s.e. 17)	60·0‡ (s.e. 1·3)	40·5‡ (s.e. 2·5)	157 (s.e. 6)	15·7 (s.e. 0·8)	0·074 (s.e. 0·044)	115·6 (s.e. 2·7)	290‡ (s.e. 16)
Diet	269	71·6‡	53·6‡	145	16·1	0·069	116·4	218‡a
Estimation 3:								
Non-diet	237 (s.e. 17)	63·4‡ (s.e. 1·8)	48·5† (s.e. 2·6)	155 (s.e. 6)	—	0·070 (s.e. 0·032)	116·7 (s.e. 3·2)	261 (s.e. 16)
Diet	264	73·6‡	57·1†b	148	—	0·066	113·2•	252

a, mean of 11 observations; b, mean of 10 observations; other abbreviations as in table I.

TABLE III—RESULTS OF COAGULATION TESTS BEFORE AND AFTER DIET: THIRD METHOD OF COMPARISON (LOW-SODIUM PATIENTS)
Figures for diet patients are means of 6 observations, and for non-diet patients of 12 observations

—	Platelets (per c.mm. whole blood)	Platelet stickiness (% of initial count)		Weight (lb.)	Prothrombin (stypven) time (sec.)	Fibrinogen (mg. on 2 ml. plasma)	Peak thrombo-plastin (%)	Serum-cholesterol (mg. per 100 ml.)
		20 min.	40 min.					
Estimation 1:								
Non-diet	238 (s.e. 22)	60·4 (s.e. 3·2)	42·0 (s.e. 3·3)	157 (s.e. 9)	14·4 (s.e. 0·4)	0·075 (s.e. 0·060)	117·0 (s.e. 2·7)	297 (s.e. 21)
Diet	263	58·4	43·2	159	13·8	0·076	123·8	312
Estimation 2:								
Non-diet	233• (s.e. 17)	60·0‡ (s.e. 1·6)	40·5† (s.e. 2·9)	157 (s.e. 8)	15·7 (s.e. 0·9)	0·074 (s.e. 0·059)	115·6 (s.e. 3·6)	290‡ (s.e. 7)
Diet	270•	71·8‡	49·6†	146	15·6	0·071	116·0	215‡
Estimation 3:								
Non-diet	237 (s.e. 21)	63·4† (s.e. 2·2)	48·5‡ (s.e. 3·4)	155 (s.e. 8)	—	0·070 (s.e. 0·039)	116·7 (s.e. 3·9)	261 (s.e. 19)
Diet	260	74·3‡	58·5‡a	150	—	0·068	112·7	254

Abbreviations as in table I.

estimation 2 (at the 5% level). No other statistically significant differences were found with any method of selection in any of the other tests, or in the patients' weights.

Decreased platelet-stickiness, compatible with a decreased coagulability of the blood, together with a lowered serum-cholesterol, have therefore been demonstrated in a group of patients with ischæmic heart-disease after dietary restriction, compared with a group of patients with ischæmic heart-disease whose diet was not restricted.

Discussion

The present investigation, which was made to determine the effect of a reduction of dietary fat on the coagulability of the blood in ischæmic heart-disease, has disclosed a significant reduction in platelet-stickiness under the conditions of the test. Estimation of platelet-stickiness is one of four tests of blood coagulability which have previously been found to differ in patients with ischæmic heart-disease compared to controls, and to reflect hypercoagulability of the patients' blood (McDonald and Edgill 1957). In the remaining three tests (thromboplastin-generation, fibrinogen-estimation, and prothrombin-time) no significant difference was revealed after the diet. It should not, however, be assumed, from this relatively brief period of dietary restriction, that blood coagulability as measured by these tests cannot be affected by the intake of fats and other substances in the diet.

The difficulty of devising a really low-fat diet for ambulant outpatients is well known. The rice-fruit diet was selected because it reduced the dietary fat and because other changes produced by it were fully described (Kempner 1948). The estimation of the 24-hour urine sodium provided independent evidence that the diet had been strictly maintained in an individual patient. The serum-cholesterol may be reduced after the rice-fruit diet (Keys 1950), particularly where it has previously been high; a statistically significant reduction of serum-cholesterol was found in the patients studied. A diet low in protein, as the rice-fruit diet is, may be accompanied by low serum-cholesterol. Ahrens (1957), reviewing the subject, remained uncertain whether the low serum-cholesterol, with diets low in fat, might not be partly due to a low level of dietary protein. The decrease in platelet-stickiness and the reduction of serum-cholesterol may be related, but many other humoral changes occur with the rice-fruit diet; a direct relation between these two is not yet proven. Further investigation is being made to determine whether the decrease in platelet-stickiness is primarily concerned with changes in the blood-lipids, and, if so, whether it can be related to the dietary intake of any particular fatty compound.

Two explanations seem possible for the continued reduction in platelet-stickiness 6–7 weeks after the end of the dietary period. Firstly, the effect of the initial dietary restriction may have persisted, and secondly, although these patients were encouraged to resume a more normal diet, some only slightly modified their strict dietary regime, and particularly kept their fat-intake low. Amongst Western people today there is a tendency for any patient with ischæmic heart-disease to restrict his intake of fat. This factor, operating among the patients who acted as controls, would have tended to lessen the differences shown between those who had dieted and those who had not.

The import of the difference in total platelet-counts found in the third method of comparison (low-sodium patients) remains at present uncertain; variation in total platelet counts has been noted at various stages in the natural history of ischæmic heart-disease (McDonald and Edgill unpublished), and seems to be related to platelet-stickiness.

Although many patients on the diet claimed subjective improvement, no conclusive evidence was obtained that this regime had either significantly improved their symptoms or altered the course of their disease.

Summary

Coagulability of the blood was studied in thirty-four patients with ischæmic heart-disease, before and after half of them had maintained a rice-fruit diet for 4–5 weeks.

A statistically significant decrease in platelet-stickiness was found after the diet, together with a statistically significant decrease in serum-cholesterol and other changes. No significant difference was found in thromboplastin generation, fibrinogen-estimation, and prothrombin-time (Russell's-viper venom, ' Stypven ').

The cooperation and advice of Dr. R. G. Macfarlane, F.R.S., and Dr. Rosemary Biggs have been of the greatest value throughout this work; we express our thanks and indebtedness to them. We thank Dr. Paul Wood, director of the Institute of Cardiology, who has constantly supported this work; the physicians of the National Heart Hospital, who have allowed us to study their patients; Dr. Helen Payling Wright, for advice on the platelet-stickiness test and for the loan of apparatus; Dr. J. O. Irwin, who made the statistical analysis; Dr. Denis Baron and Dr. Reginald Hudson, for the serum-cholesterol estimations; Miss Wilkinson-Hughes, for help in preparation of the diet; Imperial Chemical Industries Ltd. for a grant which covered part of the cost of the investigation; and Burroughs Wellcome and Co. for a supply of ' Stypven '.

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A MODIFIED VEIN-STRIPPER

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STRIPPING of the long saphenous vein is now fairly well established as the most useful single procedure in treatment of varicose veins. In most cases, however tortuous the superficial veins may appear, the main saphenous trunk is straight enough to allow the stripper to be passed up its whole length from the ankle to the groin; and, if the stripping is complete, not only is the entire vein removed so that recanalisation is impossible but also most of the communications with the deep veins are torn across. The superficial varicose tributaries are also disrupted at their junction with the main vein and, since most of them are fed from above by this source, they thrombose or collapse and cause no further symptoms.

In about 90% of cases this treatment is sufficient to relieve all symptoms and gives an excellent cosmetic result—an important consideration in a disease many of whose victims are young women. Patients requiring further treatment fall into two groups:

(1) Those with persistent superficial varicose tributaries, which may be removed by small tenotomy-sized incisions through which they may be fished out with the blunt end of a curved needle.

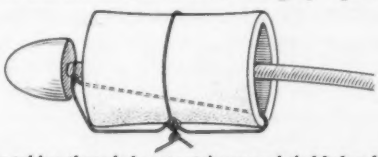
(2) Those with patent perforating veins above the medial malleolus and ulceration of the skin or nutritional changes threatening ulceration. In these patients cosmetic considerations must be disregarded and the perforating veins exposed and tied through a longitudinal incision.

In most cases, however, these extra procedures are unnecessary if stripping is complete. It is therefore most irritating if the stripper is successfully passed through the whole length of the vein and, when avulsion is attempted, the vein turns inside out a few inches above the medial malleolus and then breaks, with the result that only a small part is removed and the remainder is left in the leg. This experience must be known to most who strip veins, and is doubly annoying in that it happens most often in the more severe cases, partly because of the width of the main vein, and partly because if its being tethered by periphlebitis and the thickness of the communicating veins. A further search has then to be made through other incisions if treatment is to be effective. Having had experience of this annoying mishap, and having found on occasion that the only stripper available was too small for large veins, I produced the following simple modification.

Operation

Juxtafemoral ligature of the long saphenous vein and all its tributaries is first done in the usual way. The main saphenous vein is then exposed by a short transverse incision in front of the medial malleolus and divided between hæmostats, and its proximal end is held open with two mosquito forceps.

A piece of rubber tubing about $1^1/_2$ inches long is then selected whose outside diameter is roughly equal to that



Rubber tubing threaded on to stripper and tied below knob.

of the long saphenous vein at its junction with the femoral vein. This tubing is threaded on to the stripper and tied below the knob in the manner shown in the accompanying figure. Stout silk is used for this, and the loop taken round the base of the stripper knob is considered essential if the tubing is not to be lost in the leg. The stripper is passed up the vein to appear at the groin wound. It is seized at the small end with a needleholder and, while gentle traction is exerted, the upper edge of the tubing is coaxed under the proximal edge of the ankle incision. The vein is then avulsed. Gentle pressure from the assistant's hands is sufficient to control bleeding into the calf while the incisions are being closed and a crepe bandage is being applied.

When this modification is used, the vein concertinas within the advancing tube, whose edge appears to cut across the communicating veins. There is thus not the same liability for the vein to turn inside out and break.

This method has now been used to operate on more than fifty patients with varicose veins, many with severe periphlebitis, skin changes, and tough perforating veins, in which considerable force had to be used. In no case has stripping been incomplete. The rubber tubing has not been left behind in the subcutaneous tissues of the leg, and trauma does not appear to have been any greater than when a standard stripper has been used. There have been no complications.

Advantages

The advantages of this modification appear as follows: (1) it is simple; (2) the materials are readily available in any operating-theatre; (3) only one small size of stripper need be kept; and (4) it works.

I wish to thank Mr. J. T. Rice Edwards for permission to operate on and report his cases.

PROTRACTED FŒTAL AND NEONATAL ASPHYXIA

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IN the case described here an infant, the first of twins, endured 20 minutes' intrauterine asphyxia and 10 minutes' neonatal asphyxia, with recovery after treatment by endotracheal and intragastric oxygen; his first attempt to breathe was 40 minutes after delivery.

Case-report

The mother was a primigravida, aged 22, whose twin pregnancy was essentially normal except for mild albuminuria in the last week, for which she was admitted to hospital. Blood-pressure 130/76 mm. Hg. Labour began on the expected day. During the first stage, which lasted 20 hours, she received pethidine 400 mg. premixed with nalorphine 20 mg. (Baker 1957, Bullough 1957). The last dose of pethidine and nalorphine was given 8 hours before delivery. The fœtal heart-rates were recorded as 130 and 150 a minute throughout labour. When the membranes ruptured the liquor was stained with meconium; the presentations were first breech, second transverse; there was no prolapse of the umbilical cord. After the second stage had progressed for 105 minutes, a general anæsthetic was given; this was 30 minutes before delivery time. Times will be given from delivery.

−30 min.—Anæsthesia induced easily with nitrous oxide, oxygen, and trichloroethylene. Maintenance after the first 3 minutes was with nitrous oxide, trichloroethylene, and oxygen in a concentration of 25–50% by face mask from a semi-closed circuit, flow-rate 8 litres a minute. Fractional doses of intravenous tubocurarine 5 mg. were given to relax the pelvic muscles and depress laryngeal activity. Respiration was occasionally assisted as required.

−20 min.—Vaginal examination revealed a footling presentation, arms extended; the umbilical cord was found to be not pulsating.

−15 min.—A senior obstetrician took over and performed episiotomy, and after long and difficult manipulations extracted the baby with forceps. The right humerus was fractured.

0 min.—At birth the baby was white and limp ("white asphyxia"); the cord was not pulsating, but a slow cardiac impulse could be seen—50 beats a minute. The baby was placed in a cot with 10° head-down tilt, the pharynx was cleared by suction, and oxygen was given by nasal catheter. A phrenic-nerve stimulator was applied to the neck but caused no muscular contractions. Suction was repeated, lobeline gr. $^1/_{40}$ and nikethamide 0·5 ml. (125 mg.) were injected intramuscularly with no effect, and the phrenic-nerve stimulator was applied again with no result. These measures occupied 5 min.

+5 min.—The baby, its condition unchanged, was removed to the next operating-theatre and placed supine on the table. Laryngoscopy revealed a clear airway, the mucous membranes grey, and the vocal cords immobile in the cadaveric position. A size 00 rubber endotracheal tube was easily passed and connected up to a Boyle's anæsthetic apparatus with a semiclosed circuit, and oxygen was run in at 2 litres a minute.

+10 min.—Rhythmical inflation was started by bag-squeezing as in anæsthetic practice. The heart-rate immediately doubled to 100 a minute, the umbilical cord (clamped) started to pulsate, bobbing up and down. There were no other changes

in the baby's condition. Auscultation of the chest at this time revealed " bronchial breathing " during inflation.

+*20 min.*—Endrotracheal oxygen continued; intracardiac injection of nikethamide 0·5 ml. had no discernible effect.

+*25 min.*—Addition of 9% carbon dioxide to the inhaled oxygen had no discernible effect, and was discontinued after 3 minutes.

+*30 min.*—It was decided at this point to substitute intragastric oxygen. The endotracheal tube was removed from the trachea under vision and inserted into the œsophagus; the oxygen-flow was reduced to 200 ml. a minute. The expiratory valve acted as a safety-valve.

+*40 min.*—The baby started to gasp once a minute. The endotracheal tube was removed from the œsophagus and replaced in the trachea, and oxygen given at 2 litres a minute. The baby breathed both through and round the tube.

+*50 min.*—The baby was now gasping twice a minute.

+*60 min.*—Gasping 3 times a minute.

+*4 hours.*—Gasping 6 times a minute, the cardiac rate being 110 a minute.

+*8 hours.*—The baby was disconnected from the Boyle's machine and placed in an oxygen tent. 20 min. later the endotracheal tube was removed. The baby received two injections of lobeline gr. $^1/_{40}$ and 'Crystamycin' (a mixture of penicillin, streptomycin, and dihydrostreptomycin), and was turned frequently; breathing remained jerky.

+*11 hours.*—The baby started making attempts to cry and there were some twitching movements of the face.

+*13 hours.*—The baby cried, became pink, and slept.

+*25 hours.*—The oxygen tent was removed.

Over the next 2 days the baby was a little fretful and received chloral hydrate gr. $^1/_2$ by mouth four times. He was fed with Ringer's solution and expressed milk. Breast-feeding was under way on the 3rd day, after which the baby appeared normal though quieter than his twin brother.

The second twin was delivered by forceps 10 min. after the first, and after routine treatment was crying well in 5 min. Manual removal of the placenta and perineal repair followed. The first twin weighed 7 lb. 8 oz., the second 6 lb. 7 oz. The mother had an uneventful recovery. The child appears normal at the age of 1 year, having won a baby competition at 9 months.

Discussion

This baby had severe asphyxia, as might have been anticipated, since absence of cord pulsation had been noted 20 minutes before birth. The severity of the asphyxia was shown by:

1. Pallor and atonia.

2. Gross bradycardia. I have discovered only one report where a baby with such a severe bradycardia recovered (Akerren and Fürstenberg 1950). The heart-rate in this case was given as 20 a minute: the baby also had intrauterine asphyxia, due to cord around the neck; intragastric oxygen resulted in crying in $6^1/_2$ min.

3. The acceleration of the heart and appearance of cord pulsation immediately after endotracheal oxygen shows the undoubted value of this form of treatment in a full-term baby, though it may be contraindicated in premature babies (Lord et al. 1953).

4. The absence of any sort of response to intramuscular [illegible]etamine, intramuscular and intracardiac nikethamide, 9% [illegible] dioxide in oxygen, and the phrenic-nerve stimulator. [illegible] long absence (40 min.) of spontaneous respiratory [illegible]

5. Th[illegible]olmes and Payne (1955) report a case in which [illegible] oxygen was given. Gasping started 25 min. [illegible] and was at $^1/_2$ min. intervals for 2 hours. This baby [illegible] ac rate of 110 a minute at birth and was thus not [illegible] asphyxiated. The degree of bradycardia may be [illegible]gn of the severity of asphyxia.

[illegible]ngth of time (13 hours) before normal breathing [illegible] This is the longest time I know of with complete [illegible]olmes and Payne's case (being less asphyxiated) [illegible] the [illegible]athed normally in 1 hour. Lord et al. (1953) [illegible]

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describe a baby who did not cry or breathe normally for 2 hours, but it had gasped at 5 min. and the cardiac rate at birth was 70 a minute. (This baby had gastric hæmorrhage at 40 hours.)

7. The signs of cerebral irritation for 2 days after birth.

I agree with Lord et al. that a planned technique of neonatal resuscitation is essential. I have little experience of the phrenic-nerve stimulator, but no time was actually wasted in the use of this instrument. In a future case like this one (which is the most severe I have had to deal with that has recovered) both methods of administration of oxygen would be used simultaneously; otherwise management would be the same. I agree with Holmes and Payne (1955) that, in the present state of our knowledge of neonatal asphyxia, active resuscitation should be continued so long as the heart is beating. I also think that endotracheal or intragastric oxygen or both form the most important part of the treatment of severe neonatal asphyxia, with cardiac rates below 100 a minute.

Summary

A baby, the first of twins, had 30 minutes' perinatal asphyxia but recovered after endotracheal and intragastric administration of oxygen, and is now well. Stimulants proved ineffective.

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Preliminary Communication

HAPTOGLOBIN DETERMINATION IN DIAGNOSIS OF HÆMOLYTIC DISEASES

THE term " haptoglobin " was introduced by Polonovski and Jayle [1] to designate a group of mucoproteins belonging to the alpha-2 proteins and characterised by a pronounced affinity for hæmoglobin. In diseases accompanied by inflammatory, neoplastic, or degenerative changes in tissue the serum-haptoglobin level is raised, and this rise is a fairly good measure of the activity of the disease.[2] A few reports have also been published of low haptoglobin levels in hæmolytic [3-5] and pernicious [6] anæmia and in hepatocellular failure.[2]

In an attempt to assess the value of haptoglobin determination in the investigation of anæmias we have studied the haptoglobin level and life-span of the erythrocytes for any demonstrable correlation.

The material consists of 36 patients with clinically suspected hæmolysis. 4 of the patients were examined both before and after treatment; both examinations are included in the analysis of the data. All the patients were in hæmatological equilibrium, judged from the essentially steady hæmatocrit values and the uniform slope of the erythrocyte-survival curves.

The cases may be classified as follows:

Disease	*No. of cases*
Congenital hæmolytic anæmia	6
Acquired hæmolytic anæmia	6
Leukæmia	6
Hypersplenism	3
Hyperbilirubinæmia (indirect reaction)	3
Sideroblastic anæmia	1
Osteosclerotic anæmia	1
Hæmochromatosis	1
Secondary anæmia (cancer, infection, nephritis, abuse of phenacetin)	6
Anæmia of unknown type	3
Total	36

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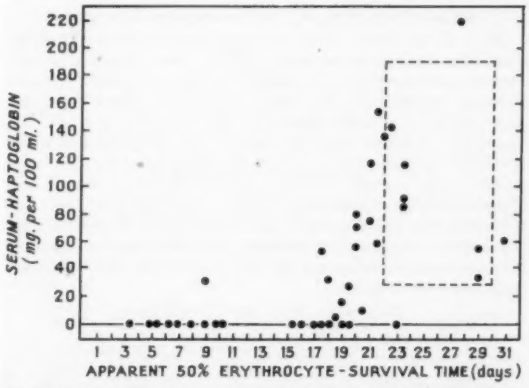

Relationship between serum-haptoglobin level and apparent 50% erythrocyte-survival time (40 determinations in 36 patients with either anæmia or indirect hyperbilirubinæmia). Broken line encloses normal range.

The haptoglobin level was determined by the method of Jayle [7] (normal value 109 mg. per 100 ml., 95% range 28–190 mg. per 100 ml.). The erythrocyte-survival time was determined after tagging the erythrocytes with ^{51}Cr in vitro. The activity of blood drawn 10 minutes after the injection was taken as 100% (normal 50% apparent survival time 26 days, range 22–30 days). The serum-methæmalbumin level was determined electrophoretically.[8]

The results are summarised in the accompanying figure. When the survival time was normal, the haptoglobin level was not depressed; whereas patients with 50% apparent survival time of less than 17½ days proved to have ahaptoglobinæmia—i.e., no measurable amount of haptoglobin in the serum. In the intermediate group with a 50% survival time of 17½–22 days the serum-haptoglobin level was normal or depressed, tending to vary with the survival time.

There were two exceptions to these rules, but in these cases the clinical picture was also somewhat unusual:

CASE 1 had a very short survival time (apparent 50% survival time 9 days), but the haptoglobin level was regularly about 30 mg. per 100 ml. This patient also had erythropoietic hyperplasia of the bone-marrow, hyperbilirubinæmia, and increased excretion of bile pigments—all signs of increased erythrocyte turnover. In spite of this the number of reticulocytes was not increased, nor was there any evidence of active disease (normal erythrocyte-sedimentation rate and normal electrophoretic pattern of serum-proteins).

CASE 2 had ahaptoglobinæmia despite a normal survival time of the circulating erythrocytes. In this case, too, there was an increased excretion of bile pigments, but the reticulocyte count was normal despite erythropoietic hyperplasia of the bone-marrow. This patient appeared to have bone-marrow dysfunction ("bone-marrow hæmolysis") with increased production but low release of erythrocytes.

Depression of the haptoglobin level must be due either to decreased production or to increased elimination of haptoglobin. Hæmoglobin injected intravenously forms a complex with haptoglobin, which is readily eliminated from the blood-stream. After all the haptoglobin has been eliminated in this way, the normal level does not return until after several days.

These observations [8] may explain ahaptoglobinæmia in diseases with associated intravascular release of hæmoglobin. Judging from the appearance of methæmalbumin in the serum, only 2 of our patients had intravascular hæmolysis, and both had ahaptoglobinæmia. Though no certain explanation can be offered for the depression of the serum-haptoglobin level in the other cases, it seems reasonable to assume an increased consumption due to the increased turnover of hæmoglobin.

Ahaptoglobinæmia is rare in diseases other than hæmolytic and pernicious anæmia. It has been found in hepatocellular failure [2 9] (in which the destruction of the red blood-cells may, however, be increased [10]) and in a few exceptional cases without anæmia.[9] Hormone therapy also can influence the haptoglobin level.[9 11]

Our preliminary results show that determination of the haptoglobin level is useful in the investigation of anæmia. A normal or a raised level argues strongly against hæmolysis; whereas a low level in the absence of hepatic disease indicates hæmolysis. Determination of the haptoglobin level is both simple and quick, and it is possible, by repeated determinations, to follow the course of a disease even in patients not in hæmatological equilibrium, in whom the erythrocyte life-span is difficult to assess.

The investigation was supported by grants from the Swedish Medical Research Council to B.F.N. and from the Medical Faculty of the University of Lund to M.N.

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Medical Societies

BRITISH ASSOCIATION OF PHYSICAL MEDICINE

THE annual meeting was held in London on April 25 and 26 under the presidency of Dr. P. BAUWENS.

Systemic Manifestations of Rheumatoid Arthritis and Pararheumatic Diseases

Dr. A. T. RICHARDSON (London) said that in collagen diseases changes in the serum-globulins were an important factor; but the chemical, physical, and serological reactions in everyday use indicated fundamental differences between these diseases. With modern diagnostic techniques such as biopsy, serological tests, and electromyography a firm diagnosis could usually be made. But clinical advances were likelier to be made if the collagen disorders were regarded as separate entities.

Dr. R. M. MASON and Dr. V. L. STEINBERG (London) had observed 15 cases of rheumatoid arthritis with pulmonary complications. In 6 there was pleural effusion; and in each of these the onset of the effusion was closely related to a flare of joint activity. Of 9 cases exhibiting diffuse parenchymatous lung changes, pneumoconiosis or lipoidosis was shown to be the cause in 4; 1 case was found to be systemic lupus erythematosus (S.L.E.); and the remaining 4, in which no cause could be found, might be presumed to have "rheumatoid lung". Dr. Mason had observed 5 cases of peripheral neuropathy complicating rheumatoid arthritis and 1 case of peripheral neuropathy complicating probable S.L.E. Neuropathy, which appeared to indicate a bad prognosis, was commonly sensory (though motor changes might follow) and usually presented with paræsthesiæ and numbness, generally of the lower limbs. Arteritis in association with rheumatoid arthritis had been recognised only quite lately; it was thought to be an infrequent but serious complication. It seemed reasonable to conclude that in addition to the frank arteritis of superficial tissues other complications of rheumatoid arthritis, such as peripheral neuropathy and possibly pleural involvement, might be manifestations of arteritis. It was not clear whether this complication was associated directly with steroid therapy or merely with the

in the baby's condition. Auscultation of the chest at this time revealed " bronchial breathing " during inflation.

+20 min.—Endrotracheal oxygen continued; intracardiac injection of nikethamide 0·5 ml. had no discernible effect.

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3. The acceleration of the heart and appearance of cord pulsation immediately after endotracheal oxygen shows the undoubted value of this form of treatment in a full-term baby, though it may be contraindicated in premature babies (Lord et al. 1953).

4. The absence of any sort of response to intramuscular lobeline, intramuscular and intracardiac nikethamide, 9% carbon dixide in oxygen, and the phrenic-nerve stimulator.

5. The long absence (40 min.) of spontaneous respiratory efforts. Holmes and Payne (1955) report a case in which endotracheal oxygen was given. Gasping started 25 min. after birth and was at $^1/_2$ min. intervals for 2 hours. This baby had a cardiac rate of 110 a minute at birth and was thus not so severely asphyxiated. The degree of bradycardia may be taken as a sign of the severity of asphyxia.

6. The length of time (13 hours) before normal breathing and crying. This is the longest time I know of with complete recovery. Holmes and Payne's case (being less asphyxiated) cried and breathed normally in 1 hour. Lord et al. (1953) describe a baby who did not cry or breathe normally for 2 hours, but it had gasped at 5 min. and the cardiac rate at birth was 70 a minute. (This baby had gastric hæmorrhage at 40 hours.)

7. The signs of cerebral irritation for 2 days after birth.

I agree with Lord et al. that a planned technique of neonatal resuscitation is essential. I have little experience of the phrenic-nerve stimulator, but no time was actually wasted in the use of this instrument. In a future case like this one (which is the most severe I have had to deal with that has recovered) both methods of administration of oxygen would be used simultaneously; otherwise management would be the same. I agree with Holmes and Payne (1955) that, in the present state of our knowledge of neonatal asphyxia, active resuscitation should be continued so long as the heart is beating. I also think that endotracheal or intragastric oxygen or both form the most important part of the treatment of severe neonatal asphyxia, with cardiac rates below 100 a minute.

Summary

A baby, the first of twins, had 30 minutes' perinatal asphyxia but recovered after endotracheal and intragastric administration of oxygen, and is now well. Stimulants proved ineffective.

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Preliminary Communication

HAPTOGLOBIN DETERMINATION IN DIAGNOSIS OF HÆMOLYTIC DISEASES

THE term " haptoglobin " was introduced by Polonovski and Jayle [1] to designate a group of mucoproteins belonging to the alpha-2 proteins and characterised by a pronounced affinity for hæmoglobin. In diseases accompanied by inflammatory, neoplastic, or degenerative changes in tissue the serum-haptoglobin level is raised, and this rise is a fairly good measure of the activity of the disease.[2] A few reports have also been published of low haptoglobin levels in hæmolytic [3-5] and pernicious [6] anæmia and in hepatocellular failure.[2]

In an attempt to assess the value of haptoglobin determination in the investigation of anæmias we have studied the haptoglobin level and life-span of the erythrocytes for any demonstrable correlation.

The material consists of 36 patients with clinically suspected hæmolysis. 4 of the patients were examined both before and after treatment; both examinations are included in the analysis of the data. All the patients were in hæmatological equilibrium, judged from the essentially steady hæmatocrit values and the uniform slope of the erythrocyte-survival curves.

The cases may be classified as follows:

Disease	*No. of cases*
Congenital hæmolytic anæmia	6
Acquired hæmolytic anæmia	6
Leukæmia	6
Hypersplenism	3
Hyperbilirubinæmia (indirect reaction)	3
Sideroblastic anæmia	1
Osteosclerotic anæmia	1
Hæmochromatosis	1
Secondary anæmia (cancer, infection, nephritis, abuse of phenacetin)	6
Anæmia of unknown type	3
Total	36

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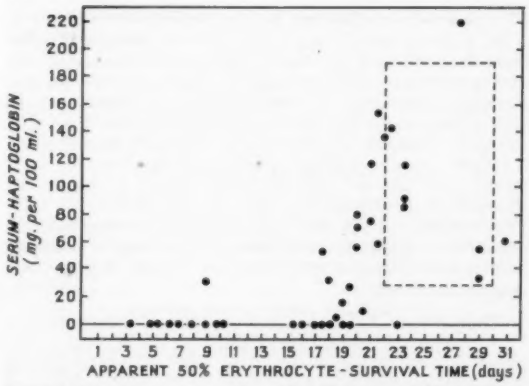

Relationship between serum-haptoglobin level and apparent 50% erythrocyte-survival time (40 determinations in 36 patients with either anæmia or indirect hyperbilirubinæmia). Broken line encloses normal range.

The haptoglobin level was determined by the method of Jayle [7] (normal value 109 mg. per 100 ml., 95% range 28–190 mg. per 100 ml.). The erythrocyte-survival time was determined after tagging the erythrocytes with ^{51}Cr in vitro. The activity of blood drawn 10 minutes after the injection was taken as 100% (normal 50% apparent survival time 26 days, range 22–30 days). The serum-methæmalbumin level was determined electrophoretically.[8]

The results are summarised in the accompanying figure. When the survival time was normal, the haptoglobin level was not depressed; whereas patients with 50% apparent survival time of less than $17^1/_2$ days proved to have ahaptoglobinæmia—i.e., no measurable amount of haptoglobin in the serum. In the intermediate group with a 50% survival time of $17^1/_2$–22 days the serum-haptoglobin level was normal or depressed, tending to vary with the survival time.

There were two exceptions to these rules, but in these cases the clinical picture was also somewhat unusual:

CASE 1 had a very short survival time (apparent 50% survival time 9 days), but the haptoglobin level was regularly about 30 mg. per 100 ml. This patient also had erythropoietic hyperplasia of the bone-marrow, hyperbilirubinæmia, and increased excretion of bile pigments—all signs of increased erythrocyte turnover. In spite of this the number of reticulocytes was not increased, nor was there any evidence of active disease (normal erythrocyte-sedimentation rate and normal electrophoretic pattern of serum-proteins).

CASE 2 had ahaptoglobinæmia despite a normal survival time of the circulating erythrocytes. In this case, too, there was an increased excretion of bile pigments, but the reticulocyte count was normal despite erythropoietic hyperplasia of the bone-marrow. This patient appeared to have bone-marrow dysfunction ("bone-marrow hæmolysis") with increased production but low release of erythrocytes.

Depression of the haptoglobin level must be due either to decreased production or to increased elimination of haptoglobin. Hæmoglobin injected intravenously forms a complex with haptoglobin, which is readily eliminated from the blood-stream. After all the haptoglobin has been eliminated in this way, the normal level does not return until after several days.

These observations [8] may explain ahaptoglobinæmia in diseases with associated intravascular release of hæmoglobin. Judging from the appearance of methæmalbumin in the serum, only 2 of our patients had intravascular hæmolysis, and both had ahaptoglobinæmia. Though no certain explanation can be offered for the depression of the serum-haptoglobin level in the other cases, it seems reasonable to assume an increased consumption due to the increased turnover of hæmoglobin.

Ahaptoglobinæmia is rare in diseases other than hæmolytic and pernicious anæmia. It has been found in hepatocellular failure [2 9] (in which the destruction of the red blood-cells may, however, be increased [10]) and in a few exceptional cases without anæmia.[9] Hormone therapy also can influence the haptoglobin level.[9 11]

Our preliminary results show that determination of the haptoglobin level is useful in the investigation of anæmia. A normal or a raised level argues strongly against hæmolysis; whereas a low level in the absence of hepatic disease indicates hæmolysis. Determination of the haptoglobin level is both simple and quick, and it is possible, by repeated determinations, to follow the course of a disease even in patients not in hæmatological equilibrium, in whom the erythrocyte life-span is difficult to assess.

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Medical Societies

BRITISH ASSOCIATION OF PHYSICAL MEDICINE

THE annual meeting was held in London on April 25 and 26 under the presidency of Dr. P. BAUWENS.

Systemic Manifestations of Rheumatoid Arthritis and Pararheumatic Diseases

Dr. A. T. RICHARDSON (London) said that in collagen diseases changes in the serum-globulins were an important factor; but the chemical, physical, and serological reactions in everyday use indicated fundamental differences between these diseases. With modern diagnostic techniques such as biopsy, serological tests, and electromyography a firm diagnosis could usually be made. But clinical advances were likelier to be made if the collagen disorders were regarded as separate entities.

Dr. R. M. MASON and Dr. V. L. STEINBERG (London) had observed 15 cases of rheumatoid arthritis with pulmonary complications. In 6 there was pleural effusion; and in each of these the onset of the effusion was closely related to a flare of joint activity. Of 9 cases exhibiting diffuse parenchymatous lung changes, pneumoconiosis or lipoidosis was shown to be the cause in 4; 1 case was found to be systemic lupus erythematosus (S.L.E.); and the remaining 4, in which no cause could be found, might be presumed to have "rheumatoid lung". Dr. Mason had observed 5 cases of peripheral neuropathy complicating rheumatoid arthritis and 1 case of peripheral neuropathy complicating probable S.L.E. Neuropathy, which appeared to indicate a bad prognosis, was commonly sensory (though motor changes might follow) and usually presented with paræsthesiæ and numbness, generally of the lower limbs. Arteritis in association with rheumatoid arthritis had been recognised only quite lately; it was thought to be an infrequent but serious complication. It seemed reasonable to conclude that in addition to the frank arteritis of superficial tissues other complications of rheumatoid arthritis, such as peripheral neuropathy and possibly pleural involvement, might be manifestations of arteritis. It was not clear whether this complication was associated directly with steroid therapy or merely with the

severe type of rheumatoid disease that was likely to be treated by steroids; but it seemed that sudden withdrawal of these drugs might set off diffuse necrotising arteritis.

Dr. A. C. BOYLE (London) said that S.L.E. was the commonest of the pararheumatic diseases presenting in departments of physical medicine, by virtue of the frequency of myalgia, arthralgia, or arthritis as the predominant feature. This disorder should always be suspected where the symptoms in the joints were out of proportion to objective signs of joint involvement, or where radiographs showed less destructive change than the clinical picture would suggest. To the dermatologist S.L.E. presented as a skin disease with involvement of the viscera and sometimes the joints; to the general physician it presented as a general illness; while to the physician in physical medicine it presented as a disease of the joints with involvement of the viscera and sometimes the skin. The discovery of the L.E.-cell phenomenon had made possible the detection of a hitherto unsuspected group of cases which appeared to be low grade and which carried a relatively good prognosis. The L.E.-cell phenomenon was an empirical test; but, in some cases where a diagnosis of S.L.E. was strongly suspected on clinical grounds and yet the test remained negative, a positive result might be obtained by giving the patient 30–40 units of corticotrophin for two to three days and then repeating the test. Dr. Boyle believed that the L.E.-cell test was specific for S.L.E., and a positive result in a case of apparently uncomplicated rheumatoid arthritis heralded systemic involvement. The diagnosis of S.L.E. should rest on the clinical features and not on an isolated pathological finding, but conversely a negative L.E.-cell test did not exclude this diagnosis.

Dr. S. MATTINGLY (London) reviewed clinical and pathological features of some of the rarer collagen disorders. In polyarteritis the abdominal manifestations were commonly misinterpreted as an abdominal emergency requiring laparotomy; in the acute stage an acute infection might be simulated. Dermatomyositis was associated in about 20% of cases with a malignant tumour. Thrombotic thrombocytopenic purpura, a rare condition that was supposedly a "collagen disease" and was thought to comprise a generalised vascular disorder affecting the intima of all small blood-vessels; it might possibly be associated with allergy to drugs and microorganisms. The rarer collagen diseases should be considered in the differential diagnosis of obscure joint or muscle pain, particularly when associated with skin lesions, fever, hypertension, or renal disease.

Mucoprotein Levels in Rheumatoid Arthritis

Dr. C. FELDMAN, Dr. E. V. HESS, and Mr. R. L. MARKHAM had made a long-term assessment of 23 patients with rheumatoid arthritis, including estimation of the two mucoprotein fractions, M1 and M2, by photometric scanning following staining of the polysaccharide moiety of the electrophoretically isolated fractions; the levels were expressed in arbitrary figures. In normal controls the range for M1 was 5–22 units, and for M2 10–26 units. In the patients M1 ranged up to 90 units and M2 up to 250 units. The range of mucoprotein values was similar in the different stages of disease, except that high values were absent in Steinbrocker's stage 1, and the mean values were not significantly different. The mean values were much higher in the moderate than in the slight cases; but in the severe cases the values were no higher than in the moderate cases. In 6 patients with inactive or slight disease activity M1 showed normal values over a period of at least two months, while the M2 values remained raised; and in 7 patients with moderate or severe disease activity M1 (but not M2) values returned to normal on single occasions. This suggested that levels of M2 more closely reflected the severity of the disease. There were wide fluctuations in mucoprotein levels between consecutive readings in individual patients, although the overall pattern correlated satisfactorily with clinical assessment. A cautious approach was needed in assessing results of single readings, but serial readings were probably a more reliable aid to clinical assessment than the erythrocyte-sedimentation rate (E.S.R.) or the C-reactive protein test.

Laboratory Indices in Rheumatic Diseases

Dr. J. H. GLYN (London) said that it was becoming increasingly clear that the E.S.R. was a fallible guide in screening and sorting patients who attended departments of physical medicine complaining of ill-defined symptoms. In 330 patients with various rheumatic disorders there had been a striking correlation between clinical activity and the following tests: C-reactive protein, total protein-bound polysaccharides, total protein, and protein : polysaccharides ratio. In established disease these gave fewer false negative readings than the E.S.R. Unfortunately all the tests had been found disappointingly unreliable in diagnostic dilemmas, and there was no justification for recommending the routine performance of such time-consuming procedures.

Therapeutic Trials in Lumbar-disc Degeneration

Dr. J. STEWART LAWRENCE (Manchester) reported an investigation into the treatment of miners with pain of lumbar or sciatic distribution associated with radiographic evidence of disc degeneration but with no neurological signs. Immobilisation of the lumbar spine by either a plaster jacket or bed rest was found to delay recovery. Mobilisation, on the other hand, produced a significantly better result, and manipulation by a physiotherapist was more effective than ionisation. Active mobilisation of the spine by exercises was still more effective. Massage produced temporary relief of pain, although it appeared to have no influence on the outcome of the malady and did nothing to hasten return to work. Cortisone given by mouth to patients in the acute stage of their disability produced no significant difference judging by comparison with similar cases treated by a suspension of cholesterol. The value of a light spinal support to heavy manual workers as a preventive to future painful and disabling attacks of pain remained unproven.

Injuries to the Collateral Ligaments of the Knee-joint

Flight Lieutenant V. B. WHITTAKER described the results in 83 cases of injury to the collateral ligament. No case with associated meniscus or bone injury was included. The ratio of medial to lateral ligament injuries in this series was 7 : 1, and, as in meniscus injuries, association football was responsible for the large majority of cases. Treatment by complete immobilisation, with or without operative repair, produced successful results in a higher proportion of cases (89%) than treatment by other less radical methods, such as heat therapy, strapping, manipulation, rest in back splint, or no treatment at all—with each of which the success-rate was (50%). Immobilisation in plaster-of-paris for five to six weeks was necessary to achieve a good result. In the 2 failures recorded in this series of 83 cases immobilisation had been maintained for less than three weeks.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

THE annual congress was held in Cardiff on April 17–19, under the presidency of Mr. J. J. HEALY.

Complications and Treatment of Hypermature Cataract

Mr. G. T. W. CASHELL (Reading) said that of the complications of hypermature cataract secondary glaucoma and uveitis were the most important. An anterior hypermature lens might prevent glaucoma.

Mr. C. A. COOK (London) considered the pathological aspects of these complications, which he described under two main headings: (1) those leading primarily to the production of glaucoma, and (2) conditions in which the primary pathological change is inflammatory and which may or may not be responsible eventually for a secondary increase in intraocular pressure. Included under (1) were phacolytic glaucoma, the hypermature intumescent lens, and the hypermature dislocated lens; and under (2) the so-called lens-induced uveitis,

which was subdivided into phacotoxic uveitis and endophthalmitis phaco-anaphylactica.

Mr. J. R. HUDSON observed that the hypermature cataract was less common than in the past, and its complications were rarely encountered. The early signs of hypermaturity should, in the absence of any general contraindication, be taken as an indication for operative treatment of a cataract.

Fanconi's Syndrome

Mr. S. J. H. MILLER (London) described a case of Fanconi's syndrome with pseudofractures which had been treated with calciferol. The calcium deposits that had developed within the cornea were dispersed by maintaining the patient in mild acidosis.

Carbonic-anhydrase Inhibitor

Dr. M. E. LANGHAM (London) reported his observations on the effect of ' Neptazane ' on the intraocular pressure of rabbits and man. Neptazane, a new inhibitor of carbonic anhydrase, diffused into the eye more readily, while leaving the body more slowly, than acetazolamide (' Diamox '). When neptazane was given intravenously both the intraocular pressure and the rate of formation of the aqueous decreased rapidly.

Toxoplasma in Ocular Disease

Prof. C. P. BEATTIE (Sheffield) said that toxoplasma had a singularly wide zoological and geographical distribution, with the prevalence of infection in man varying from 5% in Iceland to 70% in Tahiti. In this country about a quarter to a half of the adult population had been infected. In the congenital form, where at least the placental route of transmission was definite, chorioretinitis was the most constant manifestation, and indeed most toxoplasmic chorioretinitis was congenital. The acquired infections were usually innocuous, causing only a lymphadenopathy that resembled glandular fever.

Dr. J. K. A. BEVERLEY (Sheffield) described evidence that even in highly immune animals the organism could multiply.

Mr. E. S. PERKINS (London) emphasised that there is now good statistical, therapeutic, and pathological evidence that toxoplasmosis may cause uveitis in adults as well as a congenital chorioretinitis. Unfortunately, serological evidence of infection with toxoplasmosis was common in healthy adults and, while a negative dye test probably excluded toxoplasmosis, a positive test did not prove the ætiology of an individual case of uveitis. Possibly some cases of anterior uveitis were due to toxoplasmosis, but at the moment these cases could not be recognised clinically. A positive dye test was common in posterior uveitis—particularly acute and subacute cases. Cases of uveitis with a positive dye test were characterised by focal patches of chorioretinitis near the main retinal vessels or the macula or at the margin of the optic disc. In many cases the active lesion was at the edge of an old scar, suggesting that the majority of these lesions were recurrences of congenital infections. Disseminated choroiditis was not associated with a positive dye test, and was unlikely to be due to toxoplasmosis; and the results in retinal vasculitis suggested that toxoplasmosis was not a common cause of this condition.

Precancerous Melanosis of the Conjunctiva

Dr. M. LEDERMAN (London) assessed his results in 14 cases of cancerous melanosis at the Royal Marsden Hospital, London. Of those 14, 12 were submitted to radiotherapy. Of these, 2 died of metastases, and the remainder had survived for up to seven years; so at any rate some of these tumours were radiosensitive. Beta-radiation was to be recommended because of the relative lack of complications.

Chronic Uveitis

Mr. A. G. CROSS (London) said that the treatment of chronic uveitis has been revolutionised by the introduction of the adrenocortical hormones, which readily damped down the acute cases till they had run their usual short and predetermined course. But the outlook, although much better than ten years ago, was still often grave, blindness resulting.

Tolazoline Test

Mr. J. A. E. PRIMROSE (London) described the tolazoline (' Priscol ') test in glaucoma. This test produced a small but transient increase in tension in normal eyes; but in 50 cases of chronic simple glaucoma there was a mean rise in tension of 12·2 mm. Hg, while in most cases of narrow-angle glaucoma the response was normal. The tolazoline effect was probably due to its influence on the vessels because of an increased formation of aqueous humour.

Reviews of Books

An Introduction to Experimental Surgical Studies

W. J. DEMPSTER, F.R.C.S., lecturer in experimental surgery, Postgraduate Medical School of London. Oxford: Blackwell Scientific Publications. 1958. Pp. 463. 50s.

THE surgeon today stands like Cortez upon a peak, rubbing his eyes at the new vistas offered to him by the rapid developments in science. Yet he must have regrets that many of these visions may be denied to him as realities because of his own limitations. By separating the basic sciences so completely from clinical vocation the medical curriculum has in the past effectively sterilised what scientific education most surgeons received, and has conspired with the exigencies of his craft during its anatomical era to rob him of scientific understanding and know-how. Yet a new scientific age for surgery has begun and must be carried forward by men who cannot be regarded as professionals in the scientific sense, until a new generation with a different outlook displaces them.

The importance of Mr. Dempster's work lies in the tacit acceptance of this situation. It would, of course, be a herculean task at this stage to develop a book on the application of the basic sciences to surgery; Mr. Dempster starts one stage further by providing the surgeon with means of informing himself at the physiological level of experimental empiricism. The implication of the word " introduction " in the title should not be misconstrued, for this is not a work for the tyro to read overnight on seeking appointment to a professorial unit. It is introductory in the sense that the man tackling a specific problem can find not only an account of the basic work already undertaken in that field but also a useful bibliography; it is crammed with facts and is not armchair reading.

To some it may seem that the author's approach has been limited, since he has confined himself to the problems of healing, grafting, transplantation, and low temperature in general, and in particular to the thoracic, genitourinary, gastroenterological, and cardiovascular aspects. But this would be carping criticism, for here is something new arising from an original and courageous conception and completed only with considerable labour. Such a book will need frequent new editions since it is valueless if it does not keep up to date; its relatively low price is therefore important. Mr. Dempster is to be congratulated for his idea, his labour, and the service he has performed.

Cancer

Editor: RONALD W. RAVEN, F.R.C.S., surgeon, Royal Marsden Hospital, London. London: Butterworth. 1957. Vol. 1, pp. 557. Vol. 2, pp. 666. 85s. each.

To produce a System of Cancer is a formidable task at this time of expanding knowledge, and although this work comprises 6 large volumes and an index volume, the specialist must naturally expect to find gaps in the parts which cover his own special interest: this could not be otherwise if the work was to be a reasonable size.

The first two volumes, which have just appeared, are concerned with research into causation and with the pathology of human tumours. Succeeding volumes are to cover epidemiology, occupational cancer, cancer education and detection, clinical aspects, and radiotherapy and chemotherapy. The editor contributes several clinical chapters, but the general aim has been to enlist the help of many authors of differing tastes and knowledge to write chapters on their own specialty.

The first volume approaches research into causation from three aspects: the study of the incubation period in man and discussion of the environmental factors which are likely to affect man; the study of the factors concerned in the genesis of experimental tumours, such as viruses, hormones, and nutrition; and the chemical mechanisms which are concerned with normal and abnormal cell division, and thus ultimately with tumour induction.

The second volume has 32 chapters on the pathology of malignant tumours in each bodily system; and precancerous conditions, macroscopic and microscopic appearances, tumour types, and modes of spread are systematically described. The authors are all practising pathologists, and it is refreshing to find that several of them are comparatively little known but obviously experts on their subjects.

It is almost impossible to review these two volumes fairly, out of context with the succeeding volumes. However much one part may appeal to a particular reader, the work must be considered as a whole. The first volume apparently sets out to interest the non-specialist in some of the recent fundamental experimental research. As the subjects chosen are often rather abstruse, and as much has had to be omitted (though there is at times considerable overlapping), the reader will fail to get a wide view of the varied approaches towards the elucidation of the causation of tumours. For instance, the enormous amount of work on the chemical carcinogens is dismissed in a few pages, and the two-stage mechanism in carcinogenesis is not described. But, none the less, several of these chapters would form a suitable introduction to the subject for a worker embarking on that particular line of research. As far as the second volume is concerned, some existing books on the pathology of tumours are more readable, informative, and stimulating than this.

No glint of humour enlivens this grim subject. Has the editor deliberately ironed out any individual mannerisms or style of the authors? The production is impeccable, the volumes are not too heavy, and the format is pleasant. We look forward to the remaining volumes, which are expected to appear this year.

The UFAW Handbook on the Care and Management of Laboratory Animals

2nd ed. Editors: ALASTAIR N. WORDEN, M.A., B.SC., M.R.C.V.S., F.R.I.C., director of the Nutritional Research Unit, Huntingdon; W. LANE-PETTER, M.A., M.B., director of the Laboratory Animals Bureau of the Medical Research Council; hon. executive secretary, International Committee on Laboratory Animals. London: E. & S. Livingstone. 1958. Pp. 951. 70*s*.

THE first edition was published in 1947, and won an immediate welcome from all involved in animal experiments. The second edition is so much enlarged in scope that it is an entirely different book which undoubtedly meets every need likely to arise. It is everywhere obvious that the main inspiration is the wish to keep laboratory animals in health and comfort primarily in the interests of the animals, but with the inevitable result that experimental work becomes more reliable.

The introductory chapters deal with animal-house design and equipment, control of pests, breeding, and nutrition. Each experimental animal is then the subject of separate articles by experts, and in all some fifty species are considered, including the mink and the quokka, a species of marsupial. There are also chapters on birds, fish, reptiles, and invertebrates.

It would be hard to overstate the importance of this book, which should be looked on as a compulsory purchase by all who undertake animal experiments; no other single volume approaches it in value. One example of its comprehensiveness may be given: full references are provided to the extreme susceptibility of male mice to chloroform, a matter which has often caused ruinous damage to invaluable stocks, but which is far too little known. The illustrations are excellent, and the general lay-out attractive and easy to follow. By modern standards the cost is moderate.

The Story of Heart Disease

TERENCE EAST, D.M., F.R.C.P., senior physician and physician in charge of the cardiological department, King's College Hospital, London. London: William Dawson. 1958. Pp. 148. 30*s*.

IT is a condition of the Fitzpatrick lectureship that the lectures must be published in book form, and this has resulted in a number of first-class books on subjects connected with the history of medicine. This latest addition to the series ranks with the best. Dr. East's four lectures were entitled Diagnosis; Lessons of the Deadhouse; The Coronary Circulation and its Disorders; and Failure of the Circulation and its Treatment. They make a scholarly work packed with interesting information, the product of a great deal of careful reading and painstaking translations, all except one (from Russian) done by Dr. East himself.

We are told that Osler had reached the fellowship of the Royal College of Physicians before he saw a case of coronary thrombosis, and an example of the text is the quotation from George Eliot's *Middlemarch* describing what might well have been an attack of painless myocardial infarction:

> "Young Doctor Lydgate's diagnosis and prognosis were masterly, and a model to all. 'My conclusions are doubly uncertain; uncertain not only because of my fallibility, but because diseases of the heart are eminently difficult to form predictions on. I believe you are suffering from what is called fatty degeneration of the heart, which was first divined and explored by Laënnec. It is my duty to tell you that death from this disease is often sudden. At the same time, no such result can be predicted. Your condition may be consistent with a tolerably comfortable life for another fifteen years or more.' He died suddenly some weeks later. The lay writer yields nothing to the medical!"

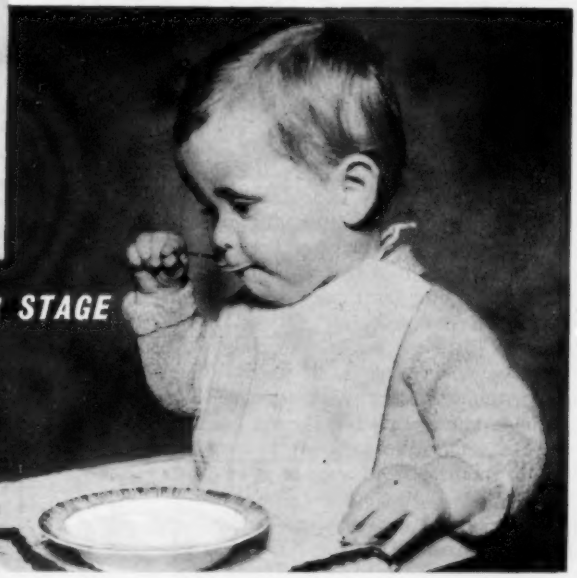
The best story, unsurpassed in vivid tragedy, is the account of the death of Thomas Arnold, of Rugby, given by his local practitioner and quoted in full.

Every cardiologist should want to read this book, and it will be welcomed with delight by anyone the least interested in medical history. It is well illustrated with title pages and portraits, mainly from the author's own collection.

General Pathology (2nd ed. London: Lloyd Luke. 1958. Pp. 932. 84*s*.).—For the second edition of this book, edited by Sir Howard Florey, new sections have been added, notably one on tumours; so the work is now more complete. The Better Student, for whom it is avowedly intended, should acquire from it a sound knowledge of the known facts of general pathology and an appreciation of its still unsolved problems. Moreover his critical faculties should be sharpened, his sense of judgment matured, and his interest so aroused that he will ask for more. For this, above all, is an interesting book: the interest stems largely from the approach—dynamic, controversial. Disorder of function is considered as important as change in structure; and dogma is eschewed. Perhaps our student will even pay some attention to the remarks on the sartorial shortcomings of pathologists. For the student who only thinks he is Better this approach has its dangers and the impact on him may be less happy. We can imagine him becoming bogged in the Slough of Un-understanding quite early in the book, and trying to extricate himself by reading some of the references cited, perhaps with some success; but he may be so delayed in his pilgrimage that all chance of reaching firm ground before nightfall will be lost. The production is excellent.

Modern Drug Treatment in Tuberculosis (London: National Association for the Prevention of Tuberculosis. 1958. Pp. 47. 5*s*.).—Written primarily for the nurse or health visitor, this brochure by Dr. J. D. Ross should also prove useful to medical students and young doctors beginning to specialise in chest disease. The advantages and hazards of chemotherapy are set forth with a fine economy of clear language, and the place of the newer drugs and of cortisone and corticotrophin in treatment is briefly reviewed. It should fulfil its purpose admirably.

FROM THE WEANING AGE . . .



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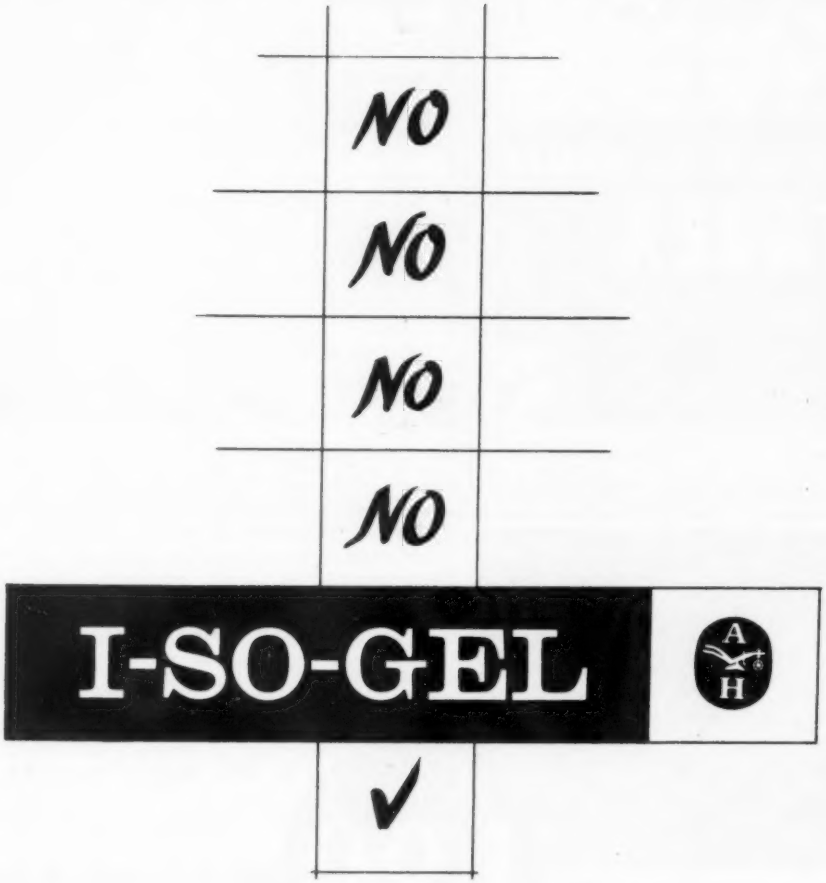

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THE LANCET
LONDON 10 MAY 1958

Poliomyelitis Vaccine and Safety Tests

MOST discussions on safety tests for poliomyelitis vaccine soon return to the tragedy of 1955 when over 200 people acquired poliomyelitis following the use of Cutter vaccine. This tragedy led directly to important changes in the manufacture and testing of vaccine [1] which have resulted in a much safer and more reliable product. Nevertheless, no biological product of this kind can be absolutely safe; and since the safety tests measure a sample of each batch of vaccine they give a guarantee of a particular degree of safety, but not of absolute safety. The Medical Research Council in this country decided that this degree of safety could be increased by substituting the relatively avirulent type-1 Brunenders strain for the more virulent Mahoney strain used in the American and Canadian (Salk) vaccine, so that if an occasional virus particle should escape the virus inactivation procedure it would be much less likely to be a paralytogenic particle. British vaccine also differs from the North American vaccine in that exhaustive safety tests are carried out on all batches by the manufacturer and independently by the Department of Biological Standards of the Medical Research Council; at the moment American vaccine is exhaustively tested by the manufacturer only, and the National Institutes of Health in the U.S.A. are not obliged to test each batch exhaustively.

Last September the Minister of Health announced that the Government would offer poliomyelitis vaccine this year to children under 15 and to expectant mothers. Since the two British firms manufacturing vaccine could not produce the required amounts in time it was decided as a temporary measure to import American vaccine, provided that tests by the manufacturer and by the Department of Biological Standards in this country showed the vaccine to be satisfactory. The manufacture of poliomyelitis vaccine is an extremely difficult process, and the testing procedure is so rigorous that it is not uncommon for large batches to prove unsatisfactory and for occasional batches to be rejected. It now appears that insufficient allowance had been made for losses of this kind when the vaccine was ordered,[2] and a series of most unlucky accidents led to the supply of vaccine falling far below what had been expected, while at the same time the demand proved greater than was anticipated. The Minister of Health has been sharply criticised for not having foreseen this situation. After it arose there were two main courses open to him. He could order new supplies of vaccine and subject them to safety tests in this country; but the safety tests would probably be made, not concurrently with the manufacturers' safety tests, but afterwards, entailing a delay of two or three months, and the vaccine would not be ready before August when the peak incidence of poliomyelitis is expected. Instead, on the advice of the Medical Research Council, the Minister (whose statement in the House of Commons is summarised on p. 1025) chose the other main possibility—namely, to import American vaccine and omit the safety test in this country. This is regarded as an emergency measure and is intended to be purely temporary.

Leaving political considerations aside, the immediate medical advantages of this choice should outweigh the disadvantages. Vast experience with the manufacture and testing of Salk vaccine has been built up in the U.S.A., and today there is a very low probability of inducing poliomyelitis from injection of vaccine which has passed the American safety tests,[3] while on the other hand a substantial proportion of those who receive the vaccine should be protected from paralytic disease this summer. But the Medical Research Council have described three degrees of safety; British-made and British-tested vaccine is in the highest category of safety, while American-made vaccine untested in this country is in the lowest; and doctors and parents can hardly be blamed if they have difficulty in deciding whether to advise or to agree to inoculations of vaccine which is declared to be not the safest. Furthermore, if cases of paralytic poliomyelitis arise in association with injections of so-called "untested" vaccine—a situation which is likely on chance grounds alone—adverse publicity could prejudice future vaccination in this country.

The Government, in accordance with the Council's advice, propose to restore check tests by the Council at the earliest possible moment; and they look forward to the time when they can dispense with the need for any vaccine containing the Mahoney strain. Whatever differences of opinion there may be about the wisdom of the Minister's choice, at least everyone can heartily welcome this prospect.

Oral Diuretics

DIURETIC agents were discussed two years ago by the Royal Society of Medicine [4]; and last month the use of diuretics in cardiac failure was the subject of a symposium at the annual meeting of the Cardiac Society in Leeds. In the first of these discussions the limitations of oral diuretics, especially of acetazolamide ('Diamox'), were deservedly stressed; in the second it was apparent that an effective oral diuretic was just round the corner, if not already here. In diuretic therapy we shall doubtless continue to rely heavily on the organic mercurials given by injection; these we owe to the happy chance that diuresis during 'Novasurol' antisyphilitic treatment of a non-œdematous patient impinged on the prepared mind of ALFRED VOGL.[5] The quest for an oral diuretic has gone on without benefit of any comparable serendipity, and is only now beginning to promise real success. We have for some years had oral diuretic agents less potent than mercurials but potent enough to control early congestive failure in conjunction with digitalis and a low-salt diet; only recently have we gained in chlorothiazide an agent of comparable diuretic potency to mercurials given by injection.

1. Technical Committee on Poliomyelitis Vaccine. *Amer. J. Hyg.* 1956, **64**, 104.
2. See *Lancet*, May 3, 1958, p. 972.
3. Smadel, J. E. *Bull. N.Y. Acad. Med.* 1957, **33**, 385.
4. *Proc. R. Soc. Med.* 1956, **49**, 623.
5. Vogl, A. *Amer. Heart J.* 1950, **39**, 881.

To relieve cardiac œdema or pulmonary congestion, it is necessary to reduce the sodium content of the body; an increased excretion of water alone, or of an anion unaccompanied by sodium, is in this context irrelevant. In theory the ideal diuretic would increase the amount of sodium filtered by the glomeruli, or diminish directly the amount of sodium reabsorbed by the tubules; in practice the most effective agents at present are those which act primarily by diminishing chloride reabsorption, the increased output of chloride being then accompanied by natriuresis. When the general treatment of a cardiac invalid with rest and digitalis is effective, the glomerular filtration-rate (G.F.R.) increases and œdema may be prevented or diminished, so comparatively ineffective diuretic agents may appear to have worked efficiently. The diuretic action of theophylline drugs depends mainly on an increase in G.F.R., and some patients who have become resistant to mercurials may respond once again when aminophylline in a dose of up to 0·5 g. is given intravenously two hours after the mercurial injection.[6] VOGL [7] advocates the use of oral theophylline preparations as an adjuvant to diuretic therapy. Decreased reabsorption of sodium can be directly effected by inducing an osmotic diuresis or by inhibiting the production of aldosterone, which is often increased in œdematous patients.[8] Interest in urea as an oral osmotic diuretic has recently been revived [9]; but large doses are needed, and the incidence of anorexia and nausea is fairly high. The production of aldosterone can be inhibited by amphenone,[10] but the toxic effects of this drug preclude its therapeutic use.

Several drugs act mainly by depressing anion reabsorption. The carbonic anhydrase inhibitors, which depress bicarbonate reabsorption, are of little value in the treatment of œdema, for they quickly lose their effect as the plasma-bicarbonate level falls, and with it the amount of bicarbonate filtered into the nephron; there is also a tendency to a greater loss of potassium than with mercurial diuretics.[6] Since the amount of chloride entering the nephron is normally about three times as great as the amount of bicarbonate,[6] there is a greater potentiality of effectiveness for drugs which depress the reabsorption of chloride rather than of bicarbonate. Three groups of drugs have been tested fairly extensively as oral chloruretic agents. These are the oral organic mercurials; the aminouracil compounds; and substituted benzothiodiazine (chlorothiazide).

Oral mercurials, such as chlormerodrin ('Mercholran'), may cause diarrhœa, whether because they inhibit fluid absorption in the bowel as well as in the nephron or because the intestinal epithelium is highly susceptible to mercurial toxicity; and we agree with the view of GOODMAN and GILMAN [11]:

"The oral administration of mercurial diuretics obviates the necessity of injection at the price of gastro-intestinal irritation, higher total dosage of mercury, greater danger of systemic mercury poisoning, and a more delayed and less complete diuretic response. The route is ineffective when a rapid mobilisation of œdema fluid is desired in an acutely ill individual."

Their final comment applies, we believe, with equal force to the aminouracil compounds. While these have some diuretic potency, the incidence of side-effects is high, especially with aminometradine ('Mictine'); the frequency of side-effects is distinctly lower with amisometradine ('Rolicton'), and this drug was found to be of some value in preventing recurrence of œdema which had been got rid of by mercurials.[12] The aminouracil compounds quickly lose their effect, and do not really stand comparison with organic mercurials.[13] Chlorothiazide is in a quite different category of effectiveness from the oral mercurials and the aminouracil drugs.

In potency it is comparable to the mercurials given by injection, and may even produce diuresis in patients who have become resistant to mercurial diuretics.[14 15] Favourable clinical reports on its effectiveness in generalised œdema have appeared both in America [14 16 17] and in this country.[14 18] It does seem that we now have a potent oral diuretic that not only can control œdema but also, for good measure, has some hypotensive action.[19] If our satisfaction at this should appear a little half-hearted, it is because we foresee possible abuse of a drug which, though convenient and potent, is also expensive and not devoid of side-effects. Gastrointestinal side-effects seem to be uncommon, but potassium depletion has been observed [14 15]; this can be controlled by giving daily supplements of 2–6 g. of potassium chloride.[15] One patient had an erythematous rash which disappeared when the drug was stopped.[17] Hypochloræmia has been observed in patients taking chlorothiazide,[13] but should be controllable by ammonium or potassium chloride. The cost is also of some importance. According to a pricing bureau the basic cost to the N.H.S. of three injections of mersalyl is 1*s.* 5*d.*, whereas the basic cost of 8 g. of chlorothiazide is 9*s.* 10½*d.*; the cost of a week's treatment of œdema is thus more than six times as great with present oral treatment. No doubt the need to give injections carries substantial overheads above the basic cost; but at least the diuretic has been given, and there is no box of tablets to constitute a problem of domestic pharmacognosy or of self-medication in the next minor illness.

Chlorothiazide certainly represents a great advance in diuretic treatment. May we hope that it will become cheaper; that it will not replace the well-tried mercurials until we know more of its side-effects; and, above all, that it will not be used to treat every patient with hypertension, or who complains of breathlessness or swelling of the ankles.

6. Milne, M. D. *Proc. R. Soc. Med.* 1956, **49**, 625.
7. Vogl, A. Diuretic Therapy. Baltimore, 1953.
8. Wolff, H. P., Koczorek, K. R., Buchborn, E. *Lancet*, 1957, ii, 63.
9. Papp, C., Shirley Smith, K. *Brit. med. J.* 1957, ii, 906.
10. Renold, A. E., Crabbé, J., Hernando-Avendano, L., Nelson, D. H., Ross, E. J., Emerson, K., Thorn, G. W. *New Engl. J. Med.* 1957, **256**, 16.
11. Goodman, L. S., Gilman, A. The Pharmacological Basis of Therapeutics. New York, 1955.
12. Wener, J., Friedman, R., Schucher, R. *Canad. med. Ass. J.* 1958, **78**, 200.
13. Ford, R. V., Rochelle, J. B., Handley, C. A., Meyer, J. H., Spurr, C. L. *J. Amer. med. Ass.* 1958, **166**, 129.
14. Goodkind, M. J., Harvey, R. J., Richards, D. W. *Amer. J. med. Sci.* 1958, **235**, 164.
15. Bayliss, R. I. S., Marrack, D., Pirkis, J., Rees, J. R., Zilva, J. *Lancet*, Jan. 18, 1958, p. 120.
16. Laragh, J. H., Heinemann, H. O., Demartini, F. E. *J. Amer. med. Ass.* 1958, **166**, 145.
17. Schreiner, G. E., Bloomer, H. A. *New Engl. J. Med.* 1957, **257**, 1016.
18. Slater, J. D. H., Nabarro, J. D. N. *Lancet*, Jan. 18, 1958, p. 124.
19. Wilkins, R. W. *New Engl. J. Med.* 1957, **257**, 1026.

Tetanus

TETANUS has been recognised as a killer since its description by HIPPOCRATES. By reason of the mode of infection, the distressing signs, and the difficulty of treatment, it is a dramatic disease. The extent of its menace varies widely from one country to another. Among European countries, it kills each year 22 per million in France, Spain, and Yugoslavia, compared with only 1·7 per million in Great Britain.[1] In agricultural communities the incidence is, of course, higher; and in Brazil in the first quarter of the century the mortality was 178 per million. The efficacy of preventive inoculation is beyond question. In the first six months of the 1914–18 war there were 17,800 cases of tetanus among half a million wounded. Between 1942 and 1945 there were only 12 cases of tetanus in the United States Army,[2] in which preventive inoculation was the rule. Part of this reduction was doubtless due to the absence of horses in the latter period, but the contrast is nevertheless impressive.

Tetanus is not yet so rare as to be unimportant, but in Great Britain it *is* so rare that few people or groups can number more than a handful of cases in their experience. This makes it difficult to evaluate any new treatment, and important to draw as many conclusions as possible from collective experience. The three papers appearing in our present issue and the previous one should be considered in conjunction with last year's report from the Charity Hospital, New Orleans.[3] In the previous fourteen years as many as 558 cases were treated at this hospital. The span of fourteen years was divided into two equal periods, in the second of which antibiotics, tracheostomy, muscle relaxants, and gastrostomy were adopted. This provided as good an opportunity as any that is likely to arise to establish the value of these newer forms of treatment. The mortality was 10% lower in the second period than in the first. But even this modest reduction is robbed of much of its significance by the fact that there has been a steady decrease in mortality during the past fifty years; and the New Orleans workers hold that general supportive care is more important than any single component of treatment.

Of the newer forms of therapy, the muscle relaxants seem to offer great possibilities; and those who have faced the difficulties of their continued use for days or weeks and at last seen the patient go home cured (as did Dr. WILTON and his colleagues, whose paper appeared last week) would be unwilling to agree that this is an unimportant advance. The idea behind it—of converting a spastic patient whose respiratory mechanism is out of control into a flaccid patient whose respiration will accept control—has an appeal which is strengthened by the success of the modern treatment of respiratory paralysis. The slightness of the apparent effect of the relaxants on the mortality in the American series may be attributable to insufficient dosages; for they were not used at the Charity Hospital in the manner recommended by their advocates in this country.

1. Anders, W. *Aerztl. Wschr.* 1952, **7**, 1112.
2. Lond, A. P., Sartwell, E. P. *Bull. U.S. Army med. Dep.* 1947, **7**, 371.
3. Creech, O., Glover, A., Ochsner, A. *Ann. Surg.* 1957, **146**, 369.

Another drug which may have an important place in the treatment of tetanus is chlorpromazine, which is the subject of the papers this week by Dr. LAURENCE and his colleagues and by Dr. BARR; and its use has been reported by many other workers, including those from the Charity Hospital. Undoubtedly chlorpromazine can dramatically reduce spasticity, sometimes without greatly clouding consciousness or causing significant respiratory depression. LAURENCE et al. describe a valid comparison between chlorpromazine and the barbiturates. In this trial chlorpromazine did not appear to save more lives than the barbiturates, though its administration was easier to manage.

Despite a wealth of reports, we are still in doubt about the best method of treating this challenging disease. For instance, we still have no clear evidence whether hypertonia is better offset by muscle relaxants or central depressants. On the other hand, in the past five or six years we have learnt a good deal about the management of respiratory inadequacy. As it is this that usually kills the patient who succumbs to tetanus we might feel optimistic; but those with experience in treating the disease know only too well how commonly, despite all precautions, an unexpected asphyxial crisis carries the patient off. Even if we could always avoid asphyxia and invasion of the lungs, some patients with severe tetanus might inevitably succumb instead to fixed neurotoxin, which many believe to be unassailable by antitoxin.[4] A short incubation period and a rapid march of symptoms denote a bad prognosis, but not a hopeless one; several very severely afflicted patients have been saved by careful treatment. Clinicians differ in their choice of drugs; but protection of the lungs from invasion, the annulment of hypertonia, the maintenance of adequate respiratory exchange, and tireless supportive care clearly remain the foundations on which treatment should be based.

Annotations

THE OUTPATIENT DEPARTMENT

THE proper function of the outpatient department has hitherto not been given sufficient thought. A discussion by the hospital section of the Royal Society of Health at its congress in Eastbourne last week was therefore most opportune. In this discussion Dr. John Fry pointed out that there has been a tendency to over-stress the role of the hospital in providing inpatient care and to neglect the work of the outpatient department, whereas in terms of service to the public the outpatient department is far more important. He suggested that there is an urgent need to look into the present functions and work of the outpatient department and to plan for the future.

Dr. A. G. Emslie thought that patients usually much prefer, instead of being admitted to hospital, to attend as outpatients; for this disturbs their home life less. Owing to great advances in radiological and pathological techniques and in therapy, many more patients than formerly can now be investigated and treated as outpatients. It was agreed that this trend should be encouraged; and the functions of the outpatient department will clearly have to be

4. Ransom, F. *Lancet*, 1917, ii, 928.

reconsidered. Dr. Fry sees the outpatient departments filling three main roles—that of consultation centre, that of diagnostic centre, and that of supplying special investigations and treatment.

Dr. Emslie emphasised that outpatient work should include radiological and pathological investigations; and the almoner service is another important element. Dr. Fry pointed out there is considerable variation between general practitioners in the number of patients they refer to consultants. Do these differences depend, he asked, on individual factors such as the doctor's age, his education, the size of his list, or his family responsibilities? The discussion showed that we really need to know more of the medical, social, and other factors that may influence referral. The average family doctor refers to the consultant in hospital only some 10% of his cases; but where radiological and pathological facilities are afforded to general practitioners these facilities are extensively used. Fry himself, out of about 5000 patients at risk in any one year, refers 450 to a consultant, either as outpatients or as inpatients, and a further 320 directly to the radiological department and 375 to the pathological department.

There is no doubt that the use of outpatient departments will increase in the future; and it seems sensible to foster this increase by devoting capital money to the construction or extension of these departments. Allowance will have to be made for further special facilities—including provision for electrocardiographic examinations and investigations with radioactive isotopes. In time the outpatient department may establish itself as the main link not only between the general practitioner and the hospital but also between the preventive services, directed by the medical officer of health, and the hospital. Those participating in the discussion agreed that outpatient facilities should be associated with existing hospitals, and some doubt was expressed as to the value of "peripheral clinics" for diagnosis and consultation. There is much scope for research in the design of outpatient departments—including if possible the provision of outpatient beds in addition to casualty-recovery beds where patients can be retained for six to eight hours for observation or for minor surgical or medical procedures.

POSTOPERATIVE PAROTITIS

PAROTITIS not due to mumps was recognised as a complication of febrile illness, notably typhus, by Stephen Paget.[1] He recorded that parotitis, sometimes with suppuration, might follow diseases in the abdomen or pelvis without any signs of pyæmia or septicæmia. Paget and some of his contemporaries believed that this complication arose because of some complex connection between the parotid gland and the peritoneum and generative organs—a development of the observation by Hippocrates that orchitis was a complication of mumps.

Parotitis sometimes follows operation. The exact pathogenesis is uncertain; but the infection, which is usually staphylococcal, probably reaches the gland by way of the parotid duct. Dryness of the mouth resulting from a poor flow of saliva and lack of attention to oral hygiene are recognised predisposing factors. In 1955 Robinson[2] concluded, from a survey of hospital records, that parotitis had practically disappeared as a postoperative complication. He observed that the incidence of this complication did not decline until the advent of antibiotics, though the mortality from it fell after the introduction, about 1930, of radiotherapy as a remedy. Robinson held that the free use of antibiotics after operation probably accounted for its almost complete disappearance, and that better control of fluid and electrolyte balance and improved oral hygiene were minor factors. He argued in favour of antibiotic prophylaxis, but foresaw the potential danger of this practice in a warning that antibiotic-resistant staphylococci might, in the future, give rise to a rebirth of the condition; and now Brown et al.[3] have reported a twelvefold increase in the incidence of postoperative parotitis at the U.S. Naval Hospital, San Diego, California.

The incidence rose from 2 in 171,826 operations in 1949–56 to 7 in 47,947 operations in 1956–57. Of the 7 affected patients 3 died, and parotitis was twice held partly responsible for death. This serious complication was commoner in patients who had a stormy postoperative course, but it could be the only incident in an otherwise uneventful convalescence. *Staphylococcus aureus* was isolated from the parotid gland in 5 of the 7 cases; in the other 2 patients the lesions were aborted by early treatment. Unfortunately the antibiotic-sensitivity pattern of the staphylococci was not recorded. Brown et al. believe that this complication is likely to be related to the increasing number of carriers of antibiotic-resistant staphylococci in every hospital community. In fact, however, they report that only 7 of 136 cultures of nasopharyngeal secretions from hospital workers yielded *Staph. aureus*—a carriage-rate of only 5%. (This is an astonishingly low figure; the rate is usually about 50%). But nasal carriage is by no means the only important factor in the spread of staphylococci in hospitals.[4]

We have deplored the abuse of antibiotics in prophylaxis[5]; and these substances have no part to play in the prevention of surgical parotitis. It can only be hoped that this dangerous complication may be avoided by commonsense attention to fluid balance and oral hygiene, and by energetic measures to restrict the spread of hospital staphylococci.[4–6] Staphylococcal parotitis, once established, can progress so quickly that early diagnosis and treatment are essential. An antibiotic to which the hospital staphylococcus will probably be sensitive—chloramphenicol, erythromycin, or novobiocin—should be administered, and, in the experience of Brown et al. early radiotherapy is still of value. If these measures fail to limit the infection, surgical drainage should be established without delay. It remains to be seen whether parotitis is to become yet another manifestation of the staphylococcus plague.[7]

RETINAL PHOTOGRAPHY

SKILLED ophthalmoscopy yields information not only about local conditions but also about general disorders. But the technique is not easily mastered, and even an experienced ophthalmoscopist finds difficulty in describing his observations. A short period in an ophthalmic department is enough to impress beginners with the differences between reports on a single fundus by a group of experts; and serial observations of a progressive fundus lesion, made in ignorance of previous records, show how open to error the method is. Many progressive retinopathies, such as those associated with hypertension, diabetes, and suspected intracranial tumours, demand more accurate observation than is possible with ophthalmoscopy; and

1. Paget, S. *Lancet*, 1886, i, 732.
2. Robinson, J. R. *Surgery*, 1955, **38**, 703.
3. Brown, J. V., Sedwitz, J. L., Hanner, J. M. *U.S. Armed Forces med. J.* 1958, **9**, 161.
4. *Lancet*, March 8, 1958, p. 515.
5. *ibid.* Jan. 4, 1958, p. 37.
6. *ibid.* Feb. 8, 1958, p. 301.
7. *ibid.* 1957, i, 723.

ophthalmologists are therefore turning to photography for objective records.

The Zeiss-Nordenson retinal camera, introduced in 1915, depended for its light source initially on a carbon arc and later on a filament lamp.

An image of this source was formed by optical means at the margin of the dilated pupil and a cone of light entered the eye and illuminated an area of the retina. An aerial image of the illuminated fundus was formed within the instrument by a powerful convex lens as in indirect ophthalmoscopy; and this aerial image was photographed by a built-in camera designed on the principles of a single-lens reflex camera.

The Zeiss-Nordenson camera gave good monochromatic photographs of the retina with exposures of a tenth to a twenty-fifth of a second; but such long exposures were liable to cause failures due to blinking and ocular movements; and with colour photography (calling for exposures of a half to a fifth of a second) failures were even commoner. Modern developments in lighting have led to successful colour photography with fast exposures.[1-4] For this purpose a high-speed electronic discharge flash-lamp has been incorporated in the Zeiss-Nordenson camera, or this camera has been adapted to a xenon-arc lamp. But there is a great demand for entirely new models; and Hansell [5] describes seven which have appeared in the last year or so. Most are based on the Gullstrand ophthalmoscope and Zeiss-Nordenson camera.

Illumination for focusing is usually independent of that for photography. In most, colour photographs can be taken by rapid exposure with an electronic flash. One camera compensates not only for refractive errors including astigmatism but also for chromatic aberration in the human eye. 35 mm. film is standard, and most models have standard detachable camera bodies which may be interchanged with other instruments.

Despite all this effort, retinal photographs, even in colour, leave much to be desired; and it remains more difficult to recognise a retinal condition from a photograph than from an artist's painting. Admittedly this may be partly because the artist, like the ophthalmologist, has preconceived notions which bias his observations; but the artist can give a satisfying Mercator-like projection of the fundus which resembles the subjective impression on examining the retina. It is difficult to imagine an optical device which could do this—or a suitable method of illumination. In this respect modern retinal cameras are less satisfactory than the original Zeiss-Nordenson camera; for with them the photograph records a smaller area of fundus, and consequently a clinician who needs a record of, say, the whole length of a retinal blood-vessel, must take serial photographs and piece them together. Some of Leishman's [6] excellent illustrations are composed of eleven separate photographs. A further difficulty for the clinician wishing to use the retinal camera as a research tool concerns magnification. The size of the retinal details depends not on refractive error but on the total refractive power of the eye. For example, the optic disc will be smaller in a photograph of a large emmetropic eye than of a small emmetropic eye. One type of camera makes certain compensations for refractive power; but this modification is intended to give constant size of field—not to compensate accurately for differences in refractive power. No doubt in time these difficulties will be surmounted; but meanwhile we are a long way from achieving the perfect retinal camera.

1. Boort, H. J. J. van, Warmoltz, N. M., Winkelman, J. E. *Med. & Biol. Illustr.* 1956, **4**, 166.
2. Meyer-Schwickerath, G., Niesel, P. *Photogr. u. Forsch.* 1954, **6**, 73.
3. Loisillier, F. *Arch. Ophtal., Paris*, 1955, **15**, 395.
4. Hansell, P., Beeson, E. J. G. *Brit. J. Ophthal.* 1953, **37**, 65.
5. Hansell, P. *Med. & Biol. Illustr.* 1957, **7**, 91.
6. Leishman, R. *Brit. J. Ophthal.* 1957, **41**, 641.

MEDICINE IN ASIA: ORGANISATION AND EDUCATION

IN Europe there are about 930 people to every doctor; in Asia the corresponding figure is more than 6400, and in some parts of Asia it is higher still—e.g., over 70,000 in Indonesia and over 174,000 in Nepal. But medical services are expanding fast: before the late war there was but a handful of health centres in all Asia, but at the end of last year there were 7251 multi-purpose centres, excluding those in Japan (about 900) and China. As Dr. John B. Grant points out in a report to the Rockefeller Foundation, such swift expansion causes difficulties in organisation, and inquiries are needed into what administrative machinery should be provided. Lack of such inquiries, he says, is leading to administrative chaos in several countries. As the best solution to the problems of organisation, he suggests a regionalisation of services on the lines lately begun in Puerto Rico.[1]

Even more important is the shortage of doctors and health workers, and the fact that the graduates of many of the present medical schools (and other training institutions) are not really competent to staff the new health centres—a situation necessitating hurried courses aimed at giving the graduates training in the work they will do. The purpose of undergraduate medical education, as Dr. Grant sees it, is:

"To train an undifferentiated physician, competent to undertake general practice in his own community. A large part of general practice in Asian countries is to staff and administer peripheral health centers. The undergraduate medical curriculum of these countries is patterned on curricula of the United States and of the United Kingdom and entirely unoriented towards the health care service demands of these Asian countries. It is true that the quality of medical education should not in any way be endangered by service pressures. However, undergraduate medical education unoriented towards local needs is not quality education in the true sense."

It will not be easy, he says, to provide such education; experiments must be made in the extension of training beyond the universities' own ward and outpatient services into the community. The universities must control their own community agencies, such as health centres, where the medical clerk and the intern can have facilities to train themselves in what increasingly is becoming general practice in their community. But this must await the establishment of accepted standards of service in these centres—as yet there are none.

In some countries the necessary expansion and change is held up, not by lack of funds, but by conservatism in the faculty. Dr. Grant cites Calcutta, where none of the four medical schools has established a chair of social and preventive medicine, despite the Government's offer to pay the whole capital cost and half the running costs for five years. The solution, he thinks, is for each country to use its *new* medical colleges to establish a progressive curriculum, to serve as an example to the others. A successful demonstration is the best means of persuasion. The All India Institute of Medical Sciences, founded two years ago in New Delhi, will, it is hoped, provide such a demonstration. Moreover, each country needs an agency, representing the Ministries of Health and of Education, to plan medical education and serve as a liaison between the Government and the peripheral institutions. Such an agency could disseminate new ideas and recommendations in medical education.

1. See *Lancet*, Feb. 22, 1958, p. 440.

Congresses

INTERNAL MEDICINE

THE fifth congress of the International Society of Internal Medicine was held in Philadelphia on April 23–26, under the presidency of Dr. T. GRIER MILLER. We publish below short accounts of some of the contributions to the congress.

Medical Treatment of Hypertension

Prof. R. W. WILKINS (Boston) claimed good results from medical treatment of hypertension: in addition to rauwolfia, veratrum, hydrallazine, and ganglion-blocking agents, chlorothiazide was proving successful. He regarded its chief use as that of a hypotensive drug, in combination with other agents. Usually smaller doses could be employed: he often started with 125 mg. t.d.s., and found it unnecessary to exceed 750 mg. daily. Side-effects in 500 patients had included potassium depletion in nearly 40% (requiring replacement), nitrogen retention, sodium depletion, alkalosis, and collapse. Potassium depletion was the most frequent and important, sometimes causing cardiac arrhythmias. 5 deaths had occurred in patients receiving chlorothiazide, although it was impossible to be certain whether the drug was responsible. The reason for its hypotensive action was unknown. He also warned against the production of angina by hydrallazine due to increased cardiac output, and by ganglion-blocking drugs due to poor coronary flow.

Diet and Serum-cholesterol

Prof. H. MALMROS (Lund) reported that the serum-cholesterol level could be lowered if ethyl linoleate was added to the diet, and butter fat was also excluded. No lowering was seen if butter fat continued to be taken. Milk fat and hydrogenated whale or coconut oil added to diet caused a rise in cholesterol. Professor Malmros had treated patients with familial xanthomatosis over long periods with diets containing no milk or butter but with substitution of corn oil: the cholesterol invariably fell. He advocated this diet in coronary-artery disease.

E.C.G. Changes in Cardiac Infarction

Dr. A. MYASNIKOV (Moscow) reported that application of a piece of necrotic muscle to the normal heart in frogs and rabbits produced cardiographic changes of acute myocardial infarction. These changes were due to the migration of potassium ions from necrotic muscle into adjacent zones, and it was suggested that the changes in cardiac infarction were derived from the zone surrounding infarction rather than from the damaged muscle itself.

Anticoagulant Therapy

Dr. J. W. KEYES (Detroit) emphasised that the maximum benefit of long-term anticoagulant therapy after cardiac infarction was seen in the first 18 months, after which the death-rates of treated and untreated groups became very similar, although the mortality remained higher in the untreated group. If long-term anticoagulants were to be discontinued it was wise to wait until 18 months after an infarction. He doubted whether patients receiving anticoagulants for rheumatic auricular fibrillation with emboli could ever safely discontinue therapy.

Dr. P. E. LUCOMSKY (Moscow) regarded anticoagulants as obligatory in all cases of myocardial infarction, and they should be continued for 6 weeks. He also advised anticoagulants for severe and repeated angina.

Dr. M. WIENER (New York City) said there was no particular advantage of any one hypoprothrombinæmic drug over any of the others, and the choice depended on whether a rapid, intermediate, or long-acting preparation was required.

Dr. T. ASTRUP (Copenhagen) pointed out that anticoagulants in cases of cerebral thrombosis might carry a greater risk of hæmorrhage into the infarcted area, since he had found the meninges to possess greater fibrinolytic activity than any other tissue.

Dr. F. KOLLER (Zürich) regarded the Quick one-stage prothrombin estimation as unsatisfactory, since it did not give a true indication of what was happening. Factor IX could not be measured, but Stewart's factor could be and showed a discrepancy with the Quick test. Stewart's factor more accurately reflected the tendency to hæmorrhage than prothrombin estimation, and may prove a more reliable guide.

Dr. S. COSGRIFF (New York) advised intermittent heparin whenever the prothrombin-time fell below the therapeutic range. He also recommended oral vitamin K_1 if the prothrombin-time rose above 35 sec.

Dr. IRVING WRIGHT (New York) had found that thrombotic episodes were more common than expected following sudden cessation of therapy, and although statistical evidence was not available he had the impression that slow stoppage prevented thrombosis.

Insulin and Dehydration

Dr. J. ROGUSKI (Poznan) reported that small doses of insulin hastened rehydration in cellular dehydration caused by vomiting, but it might give rise to hypokalæmia. Mental disturbance after drainage of ascites due to hepatic cirrhosis was usually the result of hypokalæmia with or without hyponatræmia, and a similar picture could occur after long-continued treatment of heart-failure with low-sodium diet and mercurial diuretics.

Intracardiac Thrombi

Dr. H. BERG (Hamburg-Eppendorf) reported 4 cases of intracardiac thrombi diagnosed during life by auscultation over the carotid artery. Murmurs developed under observation which were either rough systolic murmurs or vibrating murmurs which changed at different times and were often intermittent. The 4 cases were proved at necropsy.

17-Hydroxycorticosteroids and Liver Disease

Dr. G. BOSSA (Naples) described estimations of 17-hydroxycorticosteroid levels in the blood of dogs and of patients with mitral stenosis and with hepatic cirrhosis. He concluded that liver disease interfered with the normal breakdown of 17-hydroxycorticosteroids, but the blood-level in such patients was unusually low, probably the result of diminished glucocorticoid secretion by the adrenal cortex.

Benign Orthostatic Albuminuria

Dr. E. LÖWGREN (Vasteras, Sweden) suggested, as a result of electrophoretic study of the blood and urine, a new mechanism for benign orthostatic albuminuria. The constant electrophoretic pattern, resembling that of lymph, seemed to indicate that the albuminuria was due to post-tubular lymphuria and was not the result of glomerular infiltration.

Corticotrophin as Diuretic

Dr. M. H. RIGOLI (Buenos Aires) reported the production of diuresis by intravenous corticotrophin in patients with acute tubular insufficiency, manifested as anuria or oliguria. The diuresis always occurred within 24 hours and did not seem to be a coincidental spontaneous diuresis, since it was produced irrespective of the day of the disease on which corticotrophin was administered. He could not explain his observations. The dose used was 50 mg. in 24 hours.

Symposium on Hæmatology

Dr. J. S. RICHARDSON (London) said that leukæmia could be preceded by a state, occasionally lasting some months, which might present as aplastic anæmia, leucopenia, thrombo-

cytopenia, or pancytopenia (hypersplenism). Occasionally macrocytic anæmia might be found. The bone-marrow did not at this stage suggest leukæmia, but some months later leukæmic cells appeared. The correct diagnosis might be suggested if an enlarging liver was encountered during the preleukæmic phase. It was tempting to believe that this condition had a multiple ætiology, but invariably progressed to leukæmia.

Dr. LUIGI VILLA (Milan) reported differences in the physical properties of desoxypentosenucloid acids in the nuclei of normal and leukæmic cells. These differences appeared to be linked with the physical state of the D.N.A. molecules.

Dr. M. ROMER (Caracas) had studied the red cells in iron-deficiency anæmia and concluded that microcytosis developed first, followed by hypochromia, and finally a fall in the number of total red cells.

Prof. HISAO MORITA (Tokyo) reported that he had established the existence of 4 blood-groups in human platelets corresponding to the ABO system. He also described a method of measuring platelet fragility.

Dr. CARL MOORE (St. Louis) emphasised that normally only 10% of food iron was absorbed, but this may be doubled in iron-deficient subjects. Ascorbic acid considerably enhanced absorption. In men iron-deficiency anæmia theoretically would take about 6 years to develop on an iron-free diet in the absence of bleeding, but only very small amounts lost continually would cause anæmia.

Arthritis and Rheumatism

Dr. R. L. BLACK (Bethesda) said that steroid therapy did not replace rest and physiotherapy, but when indicated should be used in the lowest possible dose. He had followed 59 patients with rheumatoid arthritis receiving prednisone for up to 3½ years. 8 patients died, 2 from fulminating infections and 2 from gastrointestinal hæmorrhage: the remaining 4 deaths may have been unrelated. 15 patients developed peptic ulcers, and higher doses seemed more likely to produce ulcers. 9 patients developed fractures, usually vertebral. Only 3 patients with serious complications received less than 15 mg. daily. He believed that vascular lesions similar to polyarteritis nodosa were an integral part of rheumatoid arthritis, and could be found in patients who never received steroids.

Dr. D. LONG (London) described experiments on guinea-pigs showing that thyroid activity was considerably increased if an antigen was injected into a hypersensitive animal. Thyroxine increased the severity of allergic reactions in guineapigs, and since these reacted similarly to monkeys and man, he speculated on the possibility of hyperthyroidism being the underlying basis for human hypersensitivity to streptococcal allergens. He pointed out that when thyroidectomy had been carried out in the past in patients with rheumatic fever, the symptoms had abated strikingly.

Prof. NANNA SVARTZ (Stockholm) reported that a factor capable of agglutinating sensitised erythrocytes could be demonstrated in the serum of 85% of rheumatoid-arthritis patients. This factor was precipitable in the cold, but hæmagglutinins in other collagen disorders remained in the supernatant fluid. Ultracentrifugation established that this factor was present in fractions containing macroglobulins.

During a panel discussion Dr. LONG thought that clinical trials comparing cortisone and aspirin were a waste of time, and urged research into their mode of action as a first step. He said that much of the earlier work on infection in animals receiving steroids was invalid owing to species difference, and there was little evidence of true anti-inflammatory effect apart from depression of delayed tuberculin sensitivity.

Dr. SCULL advocated large doses of steroids, and he had found different patients responded better to different compounds. He did not believe there was any increase in intercurrent infection among patients on steroids. He recommended gold for ambulant patients on steroids initially, until an effect from gold was obtained, but he did not think there was any synergistic effect. He had found improvement in patients receiving chloraginine for rheumatoid arthritis.

Dr. R. H. FREYBURG (New York) preferred not to exceed 15 mg. of prednisone or equivalent daily in males and 10 mg. in females. He has been disappointed with antimalarial drugs in rheumatoid arthritis. For acute gout he recommended colchicine, phenylbutazone, and steroids in that order of preference.

Stress and Cerebral Function

Dr. LORING CHAPMAN (New York) found that patients with chronic diseases causing prolonged stress, such as peptic ulcer or ulcerative colitis, did not show any impairment of the highest integrative functions of the brain if there was no disturbance of behaviour or mood. In patients where there was such disturbance severe loss of higher functions was found.

Aphasia and Writing

Dr. V. G. VON MUNDY (Knittelfeld) reported that aphasia as a result of hemiplegia in children who had not yet learned to write was slight and rapidly recoverable. He suggested that the unilateral development of the speech centre was related to the use of one hand for writing. Adults who were illiterate retained symmetrical speech centres, and in them aphasia was also slight or absent.

Obliterative Atherosclerosis

Dr. K. GIBINSKI (Bytom, Poland) reported comparisons between venous blood obtained from the lower limbs of subjects with obliterative atherosclerosis and blood from upper limbs. No significant difference was found in content of proteins, lipoproteins, or cholesterol. Serum-glutamic-pyruvic-transaminase was higher in lower-limb blood, and there was a marked decrease in serum-proteolytic activity. There seemed to be some correlation between this decrease of proteolytic activity and the severity of the disease.

Lipids and Coagulation

Dr. E. SZCZEKLIK (Warsaw) reported that the serum-prothrombin level, using Quick's one-stage method, and level of factor VII accompanied the rise of serum-cholesterol in early atherosclerosis, although the phospholipoids and C/P ratio remained normal. In later atherosclerosis an increase in C/P ratio occurred and in addition to increased prothrombin and factor-VII levels, there was delayed thrombin inactivation and protraction of fibrinolysis time.

Splenomegalics of Banti Type

Dr. C. CRUZ LIMA (Rio de Janeiro) found that congestive changes with thromboses in the spleen, and reticular proliferation with endophlebitis in the liver could be produced in dogs by giving horse-serum for periods up to 5 months and inducing sensitivity. He considered the picture similar in many respects to Banti's syndrome in man, and suggested that hypersensitivity might be one cause.

Hæmoptysis in Older Men

Prof. KATHERINE BOUCOT (Philadelphia) reported diagnostic and follow-up studies in a group of 395 men over 45 years who had hæmoptysis. In 43% no cause could be found, 33% had lower respiratory infections, 9% bronchial neoplasms, and in 9% the cause was cardiovascular. Only 18% who had hæmoptysis as an isolated symptom were found to have severe disease. She had not seen bronchial carcinoma in men who smoked for less than 20 years, and occasional smokers had to smoke for 40 years or more before developing a carcinoma.

Pretibial Myxœdema

Dr. OTTO WEGELIUS (Helsingfors) reported 21 patients with pretibial myxœdema in association with exophthalmos. The

peak incidence was between 40 and 60 years, and women greatly outnumbered men. 15 patients had received previous treatment for thyrotoxicosis, and pretibial myxœdema might develop as long as 2 years afterwards. As a result of animal experiments he attributed the condition to the action of thyrotrophic hormone upon the connective tissues of a hypothyroid subject in any area of slight dependent œdema—for instance, the lower legs and pretibial region.

Ventriculography in Mitral Disease

Dr. J. F. URICCHIO (Philadelphia) described the results of left ventriculography in 42 patients with mitral-valve disease. A needle was inserted directly beneath the xiphoid. Patients with significant mitral incompetence showed considerable opacification of the left atrium, and this method enabled an accurate diagnosis to be made. Arrhythmias and conduction defects arose at the time of injection in some patients: there had been 2 deaths, 1 from cardiac arrest, and the other from direct injection into the myocardium.

Depression of Serum Freezing-point

Dr. E. OLMSTEAD (Milwaukee) described the value of the depression of the serum freezing-point in some clinical syndromes. In normal persons this figure was very constant and required only 2 ml. of plasma for its estimation. Most of the depression was due to the plasma-sodium. In overhydration the freezing-point was above normal, but it was lowered in primary water loss. In salt depletion the value remained normal despite a low serum-sodium, and in primary renal impairment the freezing-point was lowered further, despite a low or normal serum-sodium. This was probably the result of the retention of other metabolites.

Radiation Nephritis

Dr. R. W. LUXTON (Manchester) discussed radiation nephritis in 53 patients who had had renal disease after abdominal irradiation. Acute radiation nephritis may come on 8–12 months afterwards: recovery could take place, although the kidneys were permanently small. Malignant hypertension may develop during the acute stage and recovery could still take place. It may also develop slowly up to 4 years later.

Treatment of Nephrosis

Dr. H. C. GOODMAN (Bethesda) reported results of steroid treatment of 34 patients with nephrotic syndrome. There might be complete remission, complete remission with normal serum-proteins but residual albuminuria, partial remission, or none. 40 mg. of prednisolone or equivalent was given daily for a month. A good response, when it followed, invariably did so within 10–14 days. In the absence of a response, steroid withdrawal might sometimes cause diuresis. Relapses were always followed by second remission with a further course of steroids. In only 1 out of 7 patients did chloraquine seem to have any beneficial effect.

Paroxysmal Ventricular Tachycardia

Dr. G. R. HERRMANN (Galveston, Texas) had analysed 175 consecutive cases of paroxysmal supraventricular tachycardia, and found approximately 75% to be associated with organic heart-disease, and a third showed partial auriculoventricular block, usually the result of digitalis. Associated heart-disease was commoner in older patients and was usually ischæmic or hypertensive. When tachycardia complicated recent infarction the prognosis was poor. Tachycardia was poorly tolerated in presence of organic heart-disease, and he recommended rapid digitalisation, if none had been given previously. It was also useful in preventing attacks. There were no significant differences in rate between the groups.

Hydrocortisone Metabolism in Hyperthyroidism and Myxœdema

Dr. R. E. PETERSON (Bethesda) reported studies on endogenous hydrocortisone in thyrotoxicosis and myxœdema. Hydrocortisone was metabolised far quicker in thyrotoxicosis, and synthesis was more rapid. The reverse was true in myxœdema. These findings may depend upon an increase and decrease respectively of activity in the liver. He suggested that severe myxœdema might be accompanied by a relative adrenal insufficiency.

Symposium on Tuberculosis

At this symposium sponsored by the American Trudeau Society Dr. R. H. EBERT (Cleveland) said that all antituberculous drugs, if given alone, led to resistance of organisms, and combined therapy over prolonged periods without interruption was to be preferred. All drugs had toxic effects which had to be borne in mind. About 50% of all patients destroyed isoniazid very quickly, but this was perhaps prevented by concomitant P.A.S. Large doses of isoniazid in excess of 300 mg. daily were now known to be tolerated safely if pyridoxin were given simultaneously. He thought steroids had a definite place in the treatment of meningitis, combined with antibiotics.

Dr. NORMAN WILSON (Boston) said that the only indication for surgery was the failure or anticipated failure of medical treatment to control disease permanently. Resection was indicated for destroyed units of lung or persistent caseation, particularly in inspissated cavities. Thoracoplasty had a definite place in cases where there was extensive nodulation or fibrosis elsewhere in the lung, and especially in cases with open cavities and positive sputum, usually resistant to drugs. Antibiotics had made possible less extensive thoracoplasties, and he advised a separate approach to each individual case.

Carcinomatous Myoneuropathies

Sir RUSSELL BRAIN (London) described 42 examples of carcinomatous myoneuropathy, of which 75% were associated with bronchial carcinoma. Their appearance may antedate the detection of the primary tumour by up to 3 years, and although they often responded to its removal, this was by no means invariable. Occasionally the syndrome developed after the primary growth had been removed. There were varied syndromes, including cerebellar dégeneration, sensory neuropathy, and involvement of pyramidal tracts and posterior columns. Dementia could accompany these, and in a third of Sir Russell's cases a true myopathy alone was observed. Pathologically, there was considerable degeneration of the affected area, with perivascular cuffing. The exact mechanism was still unknown.

Abacterial Subacute Endocarditis

Dr. C. JIMÉNEZ-DIAZ (Madrid) said that abacterial subacute endocarditis presented a similar picture to the bacterial form, although the spleen was characteristically very large and the sedimentation-rate unusually high. The plasma showed considerable hypergammaglobulinæmia, blood-cultures were always negative, and although histologically the lesions were identical with bacterial endocaroditis, postmortem cultures of the valves never showed bacteria. He believed that the condition was not of bacterial origin, but the result of altered globulins converting the plasma into an autonoxious agent, and that rheumatic, Libman-Sacks, and other types of endocarditis might have a similar basis.

Oral Hypoglycæmic Agents

Dr. CHARLES BEST (Toronto) said that at least two-thirds of diabetics who had had tolbutamide had continued to take this satisfactorily. There was convincing evidence that oral hypoglycæmic drugs increased plasma-insulin and therefore increased pancreatic insulin production. Sugar production by the liver was decreased. In his department pancreatectomised dogs receiving tolbutamide constantly showed a rise in serum-alkaline-phosphatase and decrease in prothrombin. The animals dying had all shown characteristic changes in the Kupfer cells.

Symposium on Cardiovascular Surgery

Dr. ALFRED BLALOCK (Baltimore) reported that the survival-rate in dogs after ligating the descending branch of the left coronary artery was 30% in normals, but increased to 80% if omentopexy had been previously performed to increase collateral circulation. Experiments in dogs showed that the carotid artery transplanted into the myocardium remained patent in 90%, though the amount of fluid which could be perfused through it was very small. After this procedure the survival-rate following coronary ligation increased to 64%; but internal mammary ligation conferred no protection. He thought endarterectomy had a sound basis judged by necropsy experiments, since the perfusion-rate subsequently had much increased. He felt operation should be advised when pain continued and could not be controlled by medical means, and he used the Beck 1 operation, though the results were similar irrespective of the type of procedure.

Dr. C. W. LILLEHEI (Minneapolis) said that open heart surgery now made it possible to deal with mitral and aortic incompetence. He emphasised that calcium was seldom found in the valves of mitral incompetence, nor was the annulus usually dilated, so that pathologically such valves were well suited for surgery. In such cases he repaired the valve by inserting invalon strips beneath the cusps. Aortic incompetence could be repaired by inserting a new leaflet, and also a plastic valve beneath the coronary orifices. It was useless to employ open heart surgery unless the surgeon could work on the valve for at least 30–40 minutes, and consequently retrograde perfusion through the coronary sinus was used. Open surgery was suitable for mitral stenosis in cases with marked disability indicating gross valvular deformity in those with a history of emboli or with mitral incompetence or re-stenosis, and in all children.

Dr. ROBERT LINTON (Boston) said that indications for vascular grafts include obliterative arterial disease, aneurysms, arterial injury, tumour involvement of vessels, and congenital abnormalities. He did not now employ aortography because of increased risks, but he used arteriograms of limbs. He emphasised the successful use of end-to-end saphenous by-pass for localised obstruction in the lower limbs, which was the method of choice, and failing this he regarded thromboendarterectomy as a sound procedure. He did not use synthetic prostheses for replacement in the lower limbs owing to the risk of thrombosis, but he regarded this as very suitable for replacement of aortic lesions, followed by arterial homografts.

Medical Aspects of Cancer

For the first time in the history of the congress, a session was devoted to cancer. Prof. LOWELL COGGESHALL (Chicago) mentioned that in America $30,000,000 was devoted annually to cancer research and to helping cancer sufferers. The internist could help at all stages—diagnosis, treatment and the management of the long-term patient. Mr. E. CUYLER HAMMOND, SC.D. (New York), showed that the crude cancer-rate was increasing in all civilised countries. The abolition of other diseases augmented the rate, but did not explain the gross increase in carcinoma of the lung in men and in leukæmia in both sexes. Mortality from carcinoma of the rectum had fallen, probably due to earlier treatment; that of the stomach had fallen, but probably surgery had no part in this fall. The decline of gastric carcinoma was greater in the United States than in England. He quoted a survey in Connecticut which showed that the five-year survival-rate for cancer from 1935–40, 1941–6, 1947–51, was 19, 22, 25% for males and 29, 35, 38% for females. This rise was greatest for patients with growths of the rectum and colon, and for those with prostatic and uterine cancer. In the United States the present annual death-rate was 211,000 and it was estimated that this would rise to 322,000 in 2000 A.D., even if progress of treatment was maintained at the present rate. If coronary-artery thrombosis was abolished the cancer figure would be 566,000.

Prof. E. DAY (New York) concentrated his hopes of early diagnosis on periodic examination of available sites. A history of anæmia, loss of weight, or inertia and a family history might be precedents but the examination was all-important. He estimated that 28,800—i.e., 80% of the 36,000 who die yearly of rectal or colonic cancer—might be saved and that 10% of those who die of lung cancer might be saved by annual lung X-ray examinations; but he gave no figures to support these hopes. He was emphatic that digital rectal examination, never to be neglected, was inadequate; in 125 patients with carcinoma or with a carcinomatous polyp of the rectum, only 17 were detectable by digital examination, whereas the sigmoidoscope revealed all.

Dr. D. C. DAHLIN (Rochester) showed the value of cervical scrapes for diagnosing carcinoma of the cervix uteri. He was not in favour of similar investigations for carcinoma of the body, 90% of which caused post-menopausal bleeding and 80% of cases were amenable to surgery.

Prof. R. H. CHAMBERLAIN (Philadelphia) and Dr. SHIELDS WARREN (Boston) were modest in their claims for deep X-ray therapy and for isotopes. It was hoped that increased oxygen saturation of some tissues might increase the effectivity of radiation. Palliation was usually all that was obtained, and this was illustrated by the fact that no person with disseminated thyroid carcinoma had been cured. ^{32}P was very useful for polycythæmia vera but for leukæmia it was less effective than deep X rays. It was occasionally of value in plasma-celled myeloma causing bone pain.

Dr. S. G. TAYLOR (Chicago) said the long-term survival patient often had inevitable pain, relieved by leading an active physical or mental life, by freedom from conflicts, by good nights' sleep. Simple non-narcotic analgesics helped at first but later there was no perfect drug. Narcotics combined with narcotic antagonists had failed to establish their claim. Addiction was uncommon. For many adrenalectomy and hypophysectomy added a few years of tolerable life.

Dr. J. E. ECKENHOFF (Philadelphia) discussed the relief of pain. Besides the standard measures, injection of the cœliac ganglion by the posterior approach was often effective for carcinoma of the pancreas. A preliminary injection of procaine, if helpful, was followed by an injection of 10% æquous phenol and gave benefit for 3–4 months. Injection of somatic nerves often helped incurable pain but produced neuritis in 20%. Finally, Dr. A. M. SUTHERLAND (New York) spoke of the psychological problems. Anxiety, fears, delusions, paranoic tendencies, and compulsive practices could all be helped. No word was said about smoking.

Poliomyelitis

Prof. JONAS SALK (Pittsburgh) said that workers from many nations had contributed the foundation stones on which present progress depended. Killed vaccine with types 1, 2, and 3 virus produced antibody, and two doses given at short intervals produced a definite rise which was almost doubled by a third dose given seven months later. Although the titre fell, it remained slightly higher than it was before the injection of the third dose and remained so for 4 years. 0·1 ml. of vaccine intradermally further enhanced immunity and was a satisfactory antigen. A fourth dose was advisable as it helped approximately 10% who had not developed a satisfactory antibody level after three doses. At present he was not prepared to say dogmatically whether the value of vaccination lay in producing a hypersensitivity immune reaction.

Dr. H. M. GELFAND (New Orleans) studied 157 families, each of whom had a neonate in it. Infection with poliomyelitis usually occurred very early, 70% being infected in 7 months and 90% in 30 months. Of 105 families affected, 33 had type 1, 35 type 2, and 37 types 3. Minor illnesses occurred but no paralysis. After two years, Salk vaccination was introduced and minor infections diminished. Virus excretion in the stools was less in the vaccinated. His experiments suggest that vaccination did not influence poliovirus dissemination.

Dr. HILARY KOPROWSKI (Philadelphia) described how the poliomyelitis virus had been attenuated by passage through insusceptible hosts. After 28 mice adaptations it was given

orally to 3 children, having been proved non-pathogenic for monkeys. Later it was given to many others, in two doses with a month's interval and later a third dose at 15 to 30 months' interval. Passage through human individuals did not restore the pathogenicity as judged by injecting large doses into monkeys' brains. It therefore appeared that a safe living vaccine devoid of pathogenic power but of rich antigenic capability was being developed.

Symposium on Gastroenterology

Dr. W. L. PALMER (Chicago) discussed exfoliative cytology in the diagnosis of cancer of the digestive tract. Lavage material from 151 patients showed distinctive cells in 66 out of 69 with carcinoma, compared with 55 suggestive X-rays. 2 with œsophagitis were misdiagnosed. Among 871 examinations, 125 of 131 carcinomas of the stomach were diagnosed. X-rays diagnosed 81 correctly, 27 as suspicious, and 23 as normal. Cytological interpretation of material from the pancreatic and biliary ducts was difficult, but in 33 of 55 proven cases malignant cells were recovered. 301 examinations were negative. In 183 suspected cases of colonic carcinoma, 36 of 38 proved cases had malignant cells. Barium enema showed carcinoma in 28; it was normal in 5 and questionable in 5.

Dr. C. A. CLARKE and Dr. R. B. MCCONNELL (Liverpool) demonstrated how people with blood-group O in many parts of the world were more liable to suffer from duodenal ulcer. No satisfactory reason could be given.

Prof. A. C. FRAZER (Birmingham) discussed the differential diagnosis of steatorrhœa. He emphasised the importance of a gluten-free diet in the treatment of patients intolerant of gluten; proof of intolerance was given by a relapse when gluten was given experimentally to patients previously on a gluten-free diet. This treatment was preferable to steroid therapy, which had a use in emergency treatment.

Cardiac and Vascular Diseases

Prof. ROBERT L. LEVY (New York) compared a group of 50 cases of myocardial infarction treated with adequate anticoagulant therapy with a similar group receiving no anticoagulants. There was a 17% error of diagnosis in both groups. Mural thrombi, pulmonary emboli, and systemic emboli were equally common in both groups. 3 patients in the treated group died of hæmorrhage. The incidence of cardiac rupture in 557 cases from the literature and Professor Levy's personal experience was 4% in untreated and 12% in those treated with adequate anticoagulant therapy.

Dr. STIG RADNER (Lund) described central aortic pressure curves and left atrial pressure curves obtained by needle puncture through the suprasternal notch. During the Valsalva manœuvre and in fainting the aortic curve was characterised by a very sharp upstroke and a double notch on the downstroke. Aortic stenosis was characterised by a slow upstroke on the aortic pulse and a presystolic peak in the left atrial pulse.

Prof. ISAAC STARR (Philadelphia), in an appraisal of the ballistocardiogram, emphasised the need for rigidly standard conditions before assessing the amplitude of the main deflections. The abnormal form of some ballistocardiographic tracings had been simulated by pressure injections into the great vessels in the cadaver.

Dr. JOHN J. SAYEN, Mr. W. F. SHELDON, and Mr. GEORGE PIERCE (Philadelphia) described the changes in the myocardium of dogs following ligation of a medium branch of a coronary artery. In the affected area oxygen tension fell rapidly and muscle contraction became abnormal. Breathing oxygen and infusing noradrenaline raised oxygen tension nearly to normal and improved contraction in the ischæmic muscle.

Prof. G. E. BURCH and Dr. LAWRENCE GOLDEN (Tulane) recorded spatial vector cardiograms from 233 clinically normal subjects. Distortion of the QRS vectors was seen when the conventional E.C.G. was normal. Such distortions became commoner with advancing age, rising from 22% in the third decade to 68% in the sixth decade.

Prof. HERBERT L. RATCLIFFE and Mr. THEODORE G. YERASIMIDES (Philadelphia) found an increasing incidence, in recent decades, of arteriosclerosis in birds and mammals at the Philadelphia Zoo. This was not related to increased longevity nor to a higher dietary intake of fat. Social pressure and group conflict among the animals were possible explanations.

Effect of Rubefacients

Dr. F. A. ELLIOTT (London) described changes in blood-flow induced by rubefacient agents. After the production of an intense cutaneous erythema of the thigh, the temperature of the feet rose in 17 out of 30 patients with arterial disease of the legs. Effort tolerance was increased tenfold in some cases of angina after erythema of the chest wall had been induced, and a rise in cerebrospinal-fluid pressure was recorded in 9 out of 12 patients with cerebral infarction whose necks were made erythematous. Atropine and sympathectomy abolished this effect. A cholinergic efferent nerve pathway was postulated.

Steroid Therapy for Psoriatic Arthritis

Dr. J. L. HOLLANDER (Philadelphia) and his colleagues had used the steroid triamcinolone (delta-9-alpha-fluoro-16-alpha-hydroxyhydrocortisone) in psoriatic arthritis. Of 17 patients on 8–16 mg. daily, 11 showed almost complete healing of skin lesions. Improvement in the arthritis resembled that produced by prednisone. Cessation of triamcinolone therapy resulted in prompt return of psoriasis. Side-effects of the drug, especially anorexia, were common.

Pulmonary Hypertension

Dr. D. S. SHORT (London) described 70 post mortem pulmonary ateriograms in controls and in cases of pulmonary hypertension. Abnormal arteriograms were obtained in all cases of pulmonary hypertension, the changes being most striking in the smaller vessels. Some vessels were completely obstructed and abnormal communicating vessels were then found. There was a generalised diffuse narrowing of vessels of less than 1 mm. diameter. The narrowing was due to permanent muscular contracture, a hypersensitivity of the vessels to an initially raised pressure.

Primary Biliary Cirrhosis

Dr. ALBERT SNELL (Palo Alto, California) said that both the nutritional state of the patient and the metabolic functions of the liver were well preserved until late in the course of primary biliary cirrhosis. There was a characteristic biochemical defect, in which the serum lipids, bilirubin, and alkaline-phosphatase levels were raised. The presence or absence of cutaneous xanthomas depended on the serum-lipid level. Prolonged T-tube drainage of the bile passages might lower bilirubin and lipid levels and relieve pruritus, without conferring other benefit. Continuous or intermittent therapy with adrenocortical steroids had helped some patients. Preparations of linoleic acid (to lower serum-lipid levels) had been disappointing, though symptoms had sometimes been relieved.

Uses of the Miller-Abbott Tube

Dr. T. E. MACHELLA (Philadelphia) discussed the uses of this tube in the diagnosis and treatment of gastrointestinal diseases. They included the collection of œsophageal washings for examination for the presence of malignant cells; collection of duodenal juice for microscopic examination of bile, chemical analysis for the amount and concentration of pancreatic enzymes, and examination for the presence of exfoliated malignant cells; obturation of the duodenum as an aid to cholangiography; location of the site of intestinal bleeding; localisation of a point of partial intestinal obstruction; radiological display of small intestinal lesions; and the reproduction of distension types of pain at the suspected site of origin by air insufflation of a balloon. In treatment, the tube could be used to deflate the bowel in ileus, to protect sutures in intestinal anastomoses, and as a "medical ileostomy" to prevent small intestinal contents from reaching the colon in patients with ulcerative colitis.

Special Articles

SYRINGE SERVICE IN THE SMALL HOSPITAL

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INCREASING importance is being attached to the setting up and functioning of syringe services in hospitals. Various methods have been described, but these have been suitable only for very large units or groups of hospitals. The large initial capital outlay and the high running costs might discourage small units from attempting to set up a service; so our experience over the past three years may be of interest to other hospitals of similar size.

EQUIPMENT

Ovens.—It is agreed that boiling is ineffective, and therefore hot-air sterilisation is obligatory. We use two ovens—a small one in the admission unit, and a larger one in the laboratory for the remainder of the hospital. They cost £40 and £160 respectively and are thermostatically controlled.

Containers.—We tried glass test-tubes with adhesive-tape sealing but abandoned them because of difficulties in unsealing and because breakages of both container and syringe were high. We found also that metal containers were not ideal: they took up a lot of space and rolled about, and their contents could not be seen. Material used for packing was apt to char at the necessary temperature, and sealing was difficult. We have now adopted 'Cellophane' envelopes (McCartney 1951) and consider this the ideal method. The envelopes are brittle after heating and should be allowed to cool for an hour before being touched.

Syringes are all glass with metal nozzle able to withstand sterilisation at 160°C in the hot-air oven, in the following sizes: 2 ml., 5 ml., and 10 ml.

Needles are stainless-steel hypodermic nos. 12 and 20, intradermal, and serum no. 1.

Cellophane envelopes in the following sizes: $7 \times 2^1/_2 \times {}^3/_4$ in. flap (syringes); $3^1/_4 \times 1 \times {}^3/_4$ in. flap (needles). The two expendable envelopes together cost 1·025*d.*

Miscellaneous.—Cellophane adhesive tape 1-in. rolls; suitable wire baskets and trays for the hot-air oven; lubricating solution (liquid paraffin levis *B.P.* 1 part, methylated ether 4 parts).

METHOD

The syringes are cleaned in the wards by washing in water to which a suitable cleanser has been added. 'Steroxol' is particularly suitable, especially where specimens of blood have to be taken, because it does not foam and, on drying, does not leave a film on the glass. Some other cleansing agents tend to cause a film, which is liable to hæmolyse the blood. We have obtained every cooperation from the wards because the advantages of this system have been so obvious.

Clean syringes are returned to the laboratory and placed on the shelf of a cooling hot-air oven; and this completes drying. The barrels and pistons are not interchangeable; when they are being dried off before sterilisation they are mounted in pairs on a special rack which we have designed with hollow pegs to hold the barrels and with Terry's clips mounted behind these pegs to hold the pistons. The syringes are then assembled, lubricated, and packed for sterilisation. Each batch is tested in the steriliser by means of a Browne's control tube, type 3, one tube being in each cageful of syringes. We have also tested occasional batches with cultures of *Bacillus subtilis*, a sporing bacillus. Batches of about 100 syringes are now taken and lubricated in the following manner: the piston is placed in a jar of lubricating solution up to a depth of $^1/_4$ in. and then inserted in the barrel, the piston being drawn up and down to ensure even distribution of the lubricant.

The syringes are now placed in the cellophane envelopes, and the flaps are sealed with cellophane tape, or by means of cellophane cement. The tape is cut in 3-in. lengths and stuck to the overside of the $^3/_4$-in. flap; this provides an overlap throughout and forms a complete seal.

The needles are packed in envelopes $3^1/_4 \times {}^3/_4$ in. and are protected by cellophane straws cut into suitable lengths. These are sealed in packets in the same way as the syringes. Occasionally three or more can be placed in one packet for use at electroconvulsion-therapy session with relaxants. The syringes are now placed upright in wire baskets, and the needles on suitable trays. The needles are examined each time for hooking and touched up (if necessary) on an Arkansas stone. If they are blunt they are collected and sent in batches for sharpening, which costs about 2*s.* a dozen.

Baskets and trays are placed in the hot-air oven, and the current is switched on. Sterilisation is achieved in the oven at 160°C for an hour.

The oven is allowed to cool completely before the syringes and needles are removed, when they can be handled and distributed safely.

The capacity of our present arrangements is probably 100 syringes a day, which is ample for our use. The admission unit is self-supporting. The staff are now competent to carry out the sterilisation after an initial period of instruction.

Complementary to the sterilising service has been the design and development of a piece of apparatus for freeing stuck pistons in the all-glass syringes used. No piece of apparatus at that time existed, and the idea and development has been solely the work of one of us (F. C. R.). It is designed on hydraulic principles and consists of a release adaptor similar to a double-ended Weinraud connection. On one side a small syringe is fitted and filled with water, and on the other side the stuck syringe. The pressure built up is sufficient to free any stuck syringe. This apparatus can be obtained from Messrs. Robert Whitelaw Ltd., Newcastle upon Tyne, at about 4*s.* each. Since it is so cheap it can be kept in the wards. In this hospital the problem of a stuck syringe no longer exists. Breakages averaged previously 20 a month and now rarely exceed 2 a month.

CONCLUSIONS AND SUMMARY

A simple and efficient syringe service suitable for the needs of a small hospital is described.

The capital outlay is small—certainly less than £200. There is no need for additional staff, and the running costs are low. The wastage through breakages and

deterioration of equipment through repeated boiling in hard water is eliminated.

The method can be applied also to sterilisation of other pieces of equipment—e.g., forceps, scissors, and scalpels.

Envelopes are obtainable from Clear View Ltd., Crouch Hall, London, N.8; 'Steroxol' cleaner from Messrs. La Porte Chemicals, Luton, Beds.; and the 'Klintex-Ralph' adaptor for releasing stuck syringes from Messrs. Robert Whitelaw Ltd., Klintex House, Great North Road, Newcastle upon Tyne.

REFERENCES

McCartney, J. E. (1951) *Lancet*, i, 509.
Nuffield Provincial Hospitals Trust (1957) The Planning and Organisation of Central Syringe Services. London.

POLIOMYELITIS VACCINATION

Medical Research Council Statement

LAST week the Medical Research Council issued the following statement about poliomyelitis vaccination:

(1) The Medical Research Council have been asked by the Government to advise whether, in view of the present shortage of poliomyelitis vaccine, American or Canadian Salk vaccine which has satisfactorily passed safety tests and been licensed for issue in the country of origin should be made available for use in this country without first being subjected to the safety tests of the Medical Research Council.

(2) The Council have made a full review of the current situation in the light of their responsibilities for safety testing poliomyelitis vaccine in this country. They have given careful consideration to all the available evidence on the risks attending the use of the various poliomyelitis vaccines now being produced; on the risks in different circumstances of leaving a large number of children and others in special need of protection unvaccinated during the late spring and early summer months of this year; and to information on the amount of vaccine likely, under present arrangements, to become available for use in the next few months.

(3) Three vaccines against poliomyelitis are available for consideration: the British vaccine; imported American or Canadian vaccine that has passed British safety tests; and imported vaccine from the American or Canadian sources that has not been subjected to British safety tests. The two former are now in use in this country: the latter, at present, is not, although vaccine of this type has been used extensively elsewhere.

(4) All poliomyelitis vaccine at present in use is made from three types of virus, types I, II and III. In both the British and the American or Canadian vaccines, similar strains of the type II and type III viruses are used. On the other hand, two different strains of type I virus are used. The American and Canadian vaccines include the relatively virulent type I strain, known as Mahoney; the British vaccine, the much less virulent type I strain, known as Brunenders. If, therefore, some of the virus failed to be inactivated in the course of manufacture, the British vaccine would be less likely to produce poliomyelitis on injection than would vaccines made from the Mahoney strain.

It is the use of a type I strain of low virulence that makes the British vaccine the safest yet produced.

(5) All vaccines are submitted to a series of safety tests at several stages before issue, both during and after manufacture, with the object of detecting any virus that has survived the process of inactivation. Of necessity only samples of each batch of vaccine can be tested, and the possibility inevitably remains that in the untested part of the batch a few particles of live virus may still be present. It follows, therefore, that the greater the size and number of the samples tested, the smaller is the chance of any surviving virus remaining undetected and the greater the assurance that can be given regarding the safety of the vaccine.

(6) If vaccine is submitted to an adequate number of safety tests of the full range now in use, there is little chance of contamination with live virus escaping detection. If a few particles of live virus do escape, the effect on the safety of the vaccine will depend upon their virulence. With the Brunenders strain of relatively low virulence used in the British vaccine, it is most improbable that any ill effects would follow inoculation; with the Mahoney strain, used in the American and Canadian vaccines, such a possibility could not be excluded with the same assurance.

(7) It was because the more virulent Mahoney strain is used in the preparation of American and Canadian vaccine that the Medical Research Council, when recommending that vaccine should be imported from these countries to meet the shortage of poliomyelitis vaccine in the summer of 1957, linked that recommendation with the proviso that such vaccine should be submitted to further safety testing in this country in order to increase the safeguards against any particle of live virus of the virulent strain being present in the vaccine when issued.

(8) Taking all these factors into account, the Medical Research Council believe that the three vaccines under consideration can be placed in the following order of safety:

(*a*) Vaccine made according to the British formula that has successfully passed British safety tests;

(*b*) Imported vaccine from America and Canada that has successfully passed safety tests in the country of origin and also British safety tests;

(*c*) Imported vaccine from the same sources that has successfully passed safety tests and been licensed for issue in the country of origin.

(9) After carefully weighing all the available evidence bearing on this complex problem, the Council are satisfied that the risk of producing paralytic poliomyelitis by injecting any one of these three vaccines is very slight and that a person inoculated with any one of them is substantially less likely to contract paralytic poliomyelitis than if he is left uninoculated. Nevertheless, no vaccine can be guaranteed to be wholly free from risk, and the preference should always be for the safest known vaccine.

(10) The Council reaffirm their view that British-type vaccine which has successfully passed British safety tests is the safest poliomyelitis vaccine known; that the only justifiable permanent policy is to use every endeavour to produce this in such quantities as to meet all the needs of this country; and that any policy which has recourse to less safe vaccines should, however slight the risk, only be regarded as temporary.

Next in order of preference is imported vaccine that has passed successfully British safety tests as well as tests in the country of origin.

Third is imported vaccine which, although it has successfully passed safety tests in the country of origin, has not been submitted to the further British tests carried out by the Medical Research Council in this country.

(11) The present problem arises because supplies of British vaccine and imported vaccine that have passed British safety tests are together insufficient to meet requirements, and cannot become sufficient in time to present a substantial deficit during the summer months when the incidence of poliomyelitis may be expected to increase.

(12) After carefully examining the present situation the Medical Research Council have concluded that, as it would appear to be impossible to overcome by any other means the deficit which will otherwise be inevitable during the summer months, it would be advisable as a temporary measure to issue American or Canadian vaccine which has not been submitted to British tests, provided that it has been tested and licensed for use in the country of origin.

(13) In proffering this opinion, however, the Medical Research Council wish to stress their advice that the role of imported vaccine untested in this country should be limited to that of a temporary supplement to meet the present shortage. At the same time every endeavour should be made to obtain the maximum possible supplies of British vaccine and imported vaccine which has satisfied both British tests and tests in the country of origin, so that, at the earliest possible moment, the need to use imported vaccine untested in this country will disappear. The final aim should be to dispense with the need to use any vaccine containing the Mahoney strain.

In England Now

A Running Commentary by Peripatetic Correspondents

THIS year the Royal Academy had the cooperation of the weather for the opening of its summer exhibition on May 2, and the blatantly bohemian and the firmly fashionable were able to make their improbable joint excursion to Burlington House without benefit of plastic mack or duffle coat. Turning to the pictures we found that the hanging committee had relaxed their policy of segregation and the moderns were no longer corralled in galleries VII and VIII. There was as usual something for everyone, and the visitor could turn from Mr. Merton's triptych of the *Countess of Dalkeith*—" Such a nice picture for her husband to have " as the kindly lady next to me said—to Mr. Bratby's more turgid rendering of family life in *Nell and Jeremy Sandford*. In gallery I the medical visitor will find *Lord Cohen of Birkenhead*, painted by Mr. Harold Knight, sitting before a panelled background, alert and politely attentive, as he has sat in the chair at so many meetings. In the same gallery hangs Mr. B. Fleetwood-Walker's portrait of *Professor Norman Capon*, kindly and quizzical, in muted scarlet academic gown with purple facings. In gallery V it was pleasant to find a friend from the Medical Art Society; Dr. Phoebus Tuttnauer's brilliantly coloured *Boats at Rest* lie on equally vivid orderly shingle. Those with an eye for tomorrow as well as today will find in the architectural room drawings of the Middlesex Hospital Medical School and the new College of General Practitioners.

* * *

The morning after my seven-year-old set the house on fire I arrived late at the hospital. My hair was singed and the smoke had given me conjunctivitis, stomatitis, laryngitis, bronchitis, and the jitters. The chief problem on my mind was how to ensure that the incident would not recur. During the day's work I was offered all kinds of advice.

A pædiatrician said that Johnny had obviously made a mistake, which was part of the natural process of growing up: but personally I do not care to live so dangerously. A physician (common-sense type) said that the Cautionary Tales and the story of Harriet and the Matches should be introduced; but these have long been part of the family's library. A dermatologist said the boy should have his backside tanned; but Johnny's skin is exceptionally insensitive to physical violence. Another physician (a born research-worker) said it showed an experimental mind which should be encouraged. A patient, dependent and resentful, waited a long time to see me, and, to keep her quiet, was told the reason. She said the boy should be shut away in a home—meaning that he would then be unable to delay her access to the doctor. A psychiatrist who is analytically minded told me that the desire of a child to destroy his family by fire results from a deep-seated conflict requiring prolonged psychiatric treatment. It had not occurred to me before that Johnny's fire might have been smaller rather than bigger than he intended, but after a moment's thought I dismissed the idea as ridiculous. An administrator thought that a list should be made of all items destroyed and their cost deducted from pocket money. I worked out that Johnny would still be paying when he comes of age. A surgeon suggested that the boy himself should assist in the radical operation necessary to clear the affected area.

When, full of thoughts, I returned home, my three-year-old daughter said: " Johnny is naughty. He lit a bonfire in the house. He is very sorry." I think she was right. On the hall table was a parcel addressed to me and untidily wrapped in newspaper. Its label said: THIS IS MY SEECRIT STOR. YOU CAN HAV IT. LOVE FROM JOHNNY. Inside were nine boxes of matches.

* * *

Now that cautionary cards, long familiar to diabetics, are to be carried by patients who are having long-term anticoagulant therapy, I think it is time that I put into effect an idea which has been in my mind for many years. My card or disc, which I shall always wear under my clothes, will read as follows:

> " I am a doctor. If found ill or unconscious do not call in any of the doctors or take me to any of the hospitals whose names are on the reverse side of the disc."

It will be such fun having the names engraved.

* * *

We medical students are sometimes more familiar with current theoretical speculations than with current practical treatment in the wards. Take tab. nihil. for example. Theoretically nihil is a pure placebo containing nothing except milk sugar, but in the wards it is quite effective therapeutically.

Patients complaining of severe headache are given it with the advice: " Here is something extra strong for you—just take half a tablet, on no account more!" The next day the doctor asks about the headache and is told that it has completely subsided; the patient has never felt better in his life, he has never had a better treatment, has never met a cleverer doctor . . .

My preliminary investigation of this phenomenon shows that, because of their supposed superpotency, the tablets are in fact rarely if ever taken by the patient. He feels a little uneasy about this and, to avoid further trouble with his conscience, tries to persuade the doctor that the tablets had such a splendid effect that no further treatment is necessary. My next step is going to be a redouble blind check. One group of patients will be given therapeutically active tablets and told they are a placebo, while the controls will get a placebo which they are told is therapeutically active; a second control group will get a placebo which they are told is a placebo. Indeed, one of these days I am going to put myself on a course of normal saline injections to cure my chain-smoking. In our wards normal saline has repeatedly been proved almost as effective as lobeline and it has no side-effects.

* * *

In the following correspondence the italics are mine.

Dear Dr. X, I wonder whether you would admit this patient to your psychiatric rehabilitation centre. He is shortly to be discharged from prison after a long sentence for larceny. I enclose a copy of his clinical record.

Dear Dr. Y, Thank you for your letter. Although the clinical record of your patient suggests that he is suitable for psychiatric rehabilitation, I regret that we cannot accept him as we only take patients whose behaviour is *antisocial*.

Dear Dr. X, Thank you for your letter. Perhaps you will reconsider your decision when you know more details of the patient's social history. He is aged 38 and has served 23 prison sentences, thereby, in his own words, doing " fifteen years' service ". His usual practice is to obtain a job in a hotel, usually as a kitchen porter. He then helps himself to anything he can find. He has also in the past been convicted of vagrancy, dangerous driving, being drunk and disorderly, obstructing the police in the course of their duty, causing wilful damage to both public and private property, and of assault. Personally I regard him as antisocial. I do hope you agree.

Dear Dr. Y, I regret that I cannot alter my decision about this patient, as we only take patients who are *truly antisocial*.

I am hoping to discover whether the words " truly " and " antisocial " have a technical meaning or whether they are psychiatric jargon for full beds.

* * *

I once knew a scientist who was prouder of a rejection slip from *Punch* than of all his erudite scientific papers. For myself, fame and pride knocked on the door when I became a peripatetic correspondent for the first time. Beside that all my papers on the metabolism of 5, 6, 7-hydroxycholesterol paled into insignificance. I was so proud that I showed it to my boss. He hasn't spoken to me since. I found out later that he became a peripatetic the same day. He says he knows the editor. I wonder if . . .

* * *

No wonder your correspondent didn't get very far with his one-spur idea. I tried it once and the horse went in circles.

Letters to the Editor

DEATH OF A BOXER

SIR,—In your issue of April 26 you mention an inquest on a boxer who died after lying in a semicoma for 321 days following a contest.

From time immemorial the student of medicine has been taught to look seriously on the most trivial head injury. Have his teachers ever made any serious attempt to inform the public how much permanent damage to the brain can and does follow the minor injuries which are normal and inevitable in boxing?

Maudsley Hospital,
London, S.E.5. F. B. BYROM.

TREATMENT OF ASTHMA AND HAYFEVER BY HYPNOSIS

SIR,—The importance of clarifying the commonly recognised relationship between psychogenic factors and the clinical manifestations of allergic disorders makes it desirable to submit to critical analysis the report by Dr. Mason and Dr. Black (April 26) on the abolition of allergic skin-test responses in a patient under treatment of asthma and hayfever by deep hypnosis.

They report a progressive loss of skin sensitivity to pollen allergens on the left arm of a patient undergoing weekly hypnosis and skin tests. Occasional tests on the left leg, however, continued to give positive reactions, except on one single occasion when the patient was tested on the left leg immediately on waking from a deep hypnotic trance, during which it was suggested to her that there would be no reaction to tests anywhere on the body. This loss of skin-test reactivity and the clinical improvement were attributed to the psychogenic effect of the hypnosis.

There are, however, alternative explanations for the loss of skin-test reactivity. The decreased and then negative reactions on the left arm may have been induced by the repeated vigorous skin testing. (10 pricks were made into each site compared with the one prick commonly used for diagnosis.) This phenomenon of local loss of sensitivity is not unfamiliar and may be due to local allergic desensitisation to which could be added temporary local loss of skin reactivity due to previous wealing reactions.

The inhibition by hypnotic suggestion of a single test on the left leg, performed immediately on waking from a deep hypnotic trance, could be attributed to the well-known modification of peripheral circulation by hypnosis. It is a common experience to find that patients who feel even slightly faint during testing, or whose skin is cold, fail to react to skin tests which excite vigorous reactions at other times. The wealing responses of the allergic type are acutely dependent upon peripheral blood-flow, which determines the amount of exudation of serum from capillaries rendered permeable by the products of the allergic reaction.

The claim by Dr. Mason and Dr. Black to have produced clinical improvement as well as the skin-test effects by hypnosis may have an alternative explanation.

I have had under continued observation for the past 6 years a woman patient nearing 40 years of age who has a long history of severe seasonal asthma. On three occasions she has been admitted to hospital in severe status asthmaticus. Attempts at "desensitisation" with pollen extracts were marred by reactions due to her extreme degree of hypersensitivity. She was instructed to treat herself during the spring and summer of 1956 and 1957 by making a single prick on her arm daily through a drop of 'Pollaccine' (100,000 units per ml.). The summers of 1956 and 1957 have been as free of symptoms as the case described by Dr. Mason and Dr. Black. This form of co-seasonal treatment by prick methods is used by many workers to supplement or replace pre-seasonal treatment. Dr. Mason and Dr. Black's patient could be said to have had such treatment by the vigorous weekly prick tests over a period of 10 weeks.

Whilst one would not doubt that psychological treatment may benefit individual patients, the description of individual case-histories can readily be matched, as seen above, from patients treated by either psychological or allergic methods. Convincing evidence must in this day and age rest upon carefully controlled trials of adequate numbers of patients. A trial of this nature into the specific treatment of pollen asthma by pollen extract injection has shown that more than 80% of pollen asthmatics derive considerable benefit from this treatment.[1]

Similar well-planned investigations are required for the assessment of psychological methods of treatment in allergic disorders.

Tuberculosis Research Unit,
M.R.C. Laboratories,
London, N.W.3. J. PEPYS.

SIR,—It is delightful, and to me at least not at all surprising, to get such an excellent and well-controlled demonstration (by Dr. Mason and Dr. Black in their paper of April 26) that the workings of the mind and nervous mechanism of the body are a necessary factor in the production of hayfever and asthma, and also of the modified and localised forms thereof produced by skin testing with the suitable allergen. It is also reassuring to read that this nervous mechanism is only *one* of the necessary factors for their production: the Prausnitz transference-of-serum phenomenon remained unaltered.

The comparative failure of sedative pills is again satisfactory to the pathologist, for it is a blunderbuss and not a radical treatment. They are a great saving of time and trouble for the practitioner, but the patient detects this about as quickly as he does and makes the obvious comments to his friends.

The account of the attempt at desensitisation by injection of pollen extracts is hard to follow on the essential points of dosage, timing, &c., but it sounds as if it has been inadequate.

Though the experiments were so satisfying as a demonstration, yet as a routine treatment for, let us say, 100 chance hayfever subjects I should think a properly conducted desensitisation course would have the advantage both in producing equally satisfactory results and of causing a minimal interference with the daily life of the patient.

The personal relationship between patient and doctor is always of the greatest importance, and I suspect that if doubts and fears creep into the minds of the hypnotic expert and he allows his patients to know of this, he is courting failure. That is certainly true of a desensitisation course: if, at any given point in the course of injections, the practitioner fears a reaction, and by his demeanour lets the patient know of this, then reactions he will most assuredly get with all his more suggestible patients. The importance of the relationship between patient and doctor is somewhat forgotten nowadays by modern "medical science".

St. Mary's Hospital,
London, W.2. JOHN FREEMAN.

1. Frankland, A. W., Augustin, R. *Lancet*, 1954, *i*, 1055.

GONADAL DYSGENESIS

SIR,—Dr. Ferguson-Smith (May 3) is to be congratulated on his enterprise in determining the nuclear sex of 325 male patients in a mental-deficiency hospital. He will undoubtedly be followed in his rewarding ætiological foray by a host of chromatographers, endocrinologists, and biochemists. He cannot be equally congratulated on his choice of the words "primary microrchidism" to describe his 4 patients with gonadal dysgenesis. It is quite true that it is not yet possible to give an exact ætiological description of such cases, but to describe their condition as "microrchidism"—unpronounceable word for the Sassenach—is to relate no more than our grandfathers knew.

The testicular appearances described and the conclusions which Dr. Ferguson-Smith draws from his cases have already reached the textbooks.[1]

Lawson Wilkins uses the group-term, *gonadal dysgenesis*, and the two types of testicular disorder described by Dr. Ferguson-Smith he names "tubular germinal aplasia" and "tubular fibrosis". He recognises that these disorders have a varying pathogenesis. The primitive gonad has a *cortex* (germinal epithelium), from which the germ cells are derived, and a *medulla* (mesonephros) from which the tubules and the interstitial cells are developed. He suggests that the defective development of the cortex results in germinal aplasia, while hyaline or fibrotic changes in the tubules may derive either from a defect in development of the medulla or from subsequent regressive changes.

We may wait some time for a more exact knowledge of pathogenesis, but we have already a sensible descriptive nomenclature based on rational ætiological ideas.

Derby. DOUGLAS HUBBLE.

ATHEROSCLEROSIS AND ITS CEREBRAL COMPLICATIONS IN THE SOUTH AFRICAN BANTU

SIR,—In their stimulating article [2] on this subject, Dr. Laurie and Dr. Woods make some statements in connection with my findings in atherosclerosis in the Bantu which, in view of the considerable attention this article has attracted, cannot go unchallenged.

They state that "In 3000 consecutive necropsies on Bantu in South Africa, Becker (1946) [3] found only 1 cerebral catastrophe, whereas in just under 2000 consecutive necropsies we have found 31 such patients—a prevalence almost fifty times greater than that in Becker's series". This is not correct. In my series of 3000 consecutive autopsies, I reported 68 cerebral catastrophes, an overall incidence of 2·3%.[4]

The causes of cerebral apoplexy (hæmorrhage and thrombosis) were as follows:

	No. of cases
Hypertensive arteriosclerosis	33 (*49%*)
Atheromatosis	1 (*1%*)
Congenital aneurysm	7 (*10%*)
Cardiovascular syphilis	2 (*3%*)
Embolism from endocarditis and rheumatic heart-disease	25 (*36%*)

The case ascribed to atheromatosis was one in which it was considered that this condition was the sole cause of the apoplexy; whereas in the cases of hypertensive arteriosclerosis, although atheromatosis was present in 64% of the cases, and in patients over 40 was present in nearly 100%,[3] I considered the hypertensive condition more important in the pathogenesis of the cerebral complication than the atheroma. If on the other hand it is assumed, as Laurie and Woods have done, that the major factor in the production of cerebral thrombosis and hæmorrhage is atheromatosis, then the incidence of cerebral catastrophe in my series would rise to about 1% of all necropsy cases, which is comparable with Laurie and Wood's figure of 31 cases in 2000 autopsies (1·5%). In our last 144 consecutive necropsies on Bantu subjects there were 3 cases of cerebral vascular accident (2%)—a small series but perhaps sufficient to show that the incidence of these lesions in the Bantu lies somewhere between 1 and 2%.

Laurie and Woods further state that I "found severe atherosclerosis in 26% of Bantu patients over 45, but only in 0·4% of the whole series was atherosclerosis the cause of death". They find a "significant discrepancy" between these two figures which they cannot explain. My definition of severe lesions at that time was "many lesions, together with complications such as dilatation, deformity, calcification, ulceration and thrombosis". I detailed 11 cases in which I considered the cause of death was due solely and entirely to atheromatosis, and clearly stated that it was difficult to assess how far atheroma contributed to the fatal outcome of disease of the cardiovascular system when it was associated with other cardiovascular diseases. Of 137 cases which were classed as severe atheroma, 35% died a cardiac death, but many of these cases had evidence of hypertension as well. The so-called discrepancy resolves itself into different points of view.

Finally, I should like to stress that on occasion the Bantu can and does develop just as much atherosclerosis as the European in this country. There is no inherent racial immunity to the disease. I believe that the incidence of serious complications in the Bantu, particularly coronary occlusive disease, is significantly lower.

Department of Pathology and Microbiology,
University of the Witwatersrand,
Johannesburg. B. J. P. BECKER.

THE DOCTOR'S ATTITUDE TO HIS PATIENT

SIR,—From the sidelines I have followed this correspondence with growing interest.

My attention was first directed to the subject by Dr. Balint's two papers in 1954 [1] and 1955,[2] which whetted my appetite for a careful study of his book.[3] The papers by Dr. Clyne [4] and Dr. Pasmore [5] were obviously direct results of Dr. Balint's teaching and showed that a prophet is not necessarily without honour in his own (or adopted) country.

Whilst it would be too much to ask for a universal acceptance of psychoanalytic teaching, it had not seemed to me that Balint, Clyne, Hopkins,[6] and Pasmore had put forward any particularly controversial views: they had merely stated facts and observations that any practitioner could confirm for himself if he cared to listen to his patients—though he may have to learn to listen. But evidently I was wrong. The subject is extremely controversial—and highly charged—and I have no doubt that Dr. Balint could give a ready interpretation of the resistances shown.

Yet it passes all understanding that anyone should put forward—let alone swallow—the proposition of "Scanner" [7] that "the emotional history should not have any direct influence on the doctor's clinical opinion". That the clinician may reach that opinion "without the emotional history" is no doubt often true; but to say that he "can give just as good advice and get just as good a result without ever hearing it" seems to deny many of

1. Wilkins, L. The Diagnosis and Treatment of Endocrine Disorders in Childhood and Adolescence; p. 236, p. 265. 2nd ed. Springfield, Ill.
2. Laurie, I. M., Woods, J. D. *Lancet*, Feb. 1, 1958, p. 231.
3. Becker, B. J. P. *S. Afr. J. med. Sci.* 1946, **11**, 97.
4. Becker, B. J. P. *ibid.* p. 1.

1. Balint, M. *Brit. med. J.* 1954, i, 115.
2. Balint, M. *Lancet*, 1955, i, 684.
3. Balint, M. The Doctor, His Patient, and the Illness. London, 1957.
4. Clyne, M. B. *Lancet*, Feb. 1, 1958, p. 232.
5. Pasmore, H. S. *ibid.* March 8, 1958, p. 524.
6. Hopkins, P. *ibid.* 1956, ii, 455.
7. *ibid.* April 12, 1958, p. 800.

the tenets of good medicine, from Hippocrates to Osler and beyond.

Having decided that his patient is not suffering from tuberculosis, thyrotoxicosis, or severe heart-disease, but has an anxiety reaction (a not unusual condition) how would "Scanner" proceed with his treatment without ever hearing the emotional history; or could he in fact avoid hearing it? Or would his patient then be left to "recover . . . remain neurotic . . . or become psychoneurotic"? What is the distinction between neurotic and psychoneurotic?

Dr. Clyne's and Dr. Pasmore's sails will not be sunk by a damp squib. "Scanner" will need a gun of far greater calibre, even though he has Dr. Lee [8] and Dr. Ryle [9] to play Athos and Porthos to his Aramis.

A scanner is presumably one who scans, which though defined as one who looks at closely or scrutinises is also used as meaning one who "glances at quickly; considers hastily".[10]

Nebraska Psychiatric Institute, Omaha, Nebraska, U.S.A. FRANK WINSTON.

TOXÆMIA OF PREGNANCY

SIR,—My old friend and fellow student Mr. Sophian (April 26) and I agree far more than we differ for he has accepted in toto my main thesis, which was regarded as revolutionary when it was first published a quarter of a century ago—that eclampsia results from a disturbance in *la fixité du milieu intèrieur*. He believes that this disturbance is invariably caused by renal cortical ischæmia provoked by a uterorenal reflex.

I do not accord the kidneys so exalted a position as he does, for I believe them to be but handmaidens to the hypothalamus and subject to nervous and hormonal control, both direct from the posterior pituitary and indirectly through the anterior pituitary and adrenal glands. They must obey to the limits of their structural ability, and are often hampered by mechanical factors. The only objection to his simple theoretical schema is that it does not work in practice, for hypertension, proteinuria, and œdema can occur independently of each other and in different sequences, while eclampsia occurs apart from any of these three signs.

I very much appreciate Mr. Sophian's generous remarks about my operation for denervating the internal iliac vessels. As he knows, I have been interested in the effects of afferent nervous stimuli on renal secretion since 1934 [11] and agree with him that impulses from the uterus can affect the secretion of urine, cause pallor, sweating, vomiting, a profound fall in blood-pressure, bradycardia, and acute dilatation of the pupils, and initiate the onset of labour. I merely feel that there is no justification for postulating a unique uterorenal reflex when similar effects on the kidney can be caused by afferent stimuli from other parts of the body.

I wonder whether Mr. Sophian would be so very kind as to give direct answers to the following three questions:

(1) Infants, non-pregnant women, and men die from renal cortical necrosis. If toxæmia of pregnancy results from cortical ischæmia why is eclampsia peculiar to the pregnant state?

(2) If resistance to uterine stretch is the stimulus which provokes renal ischæmia how is it that bilateral renal cortical necrosis practically never occurs in primigravidæ but is most likely to occur in association with toxæmic accidental hæmorrhage in a single pregnancy at about the seventh month in a woman who has previously borne 4 or more full-term children without toxæmic symptoms?

(3) How is it that patients with true eclampsia may secrete urine freely?

"Algebraic pebbles" together with the cooperation of the local health authorities, general practitioners, and hospital staff have reduced the incidence of eclampsia in Bradford, from 3·8 to 0·2 per 1000, and the number of cases of hypertension plus proteinuria by half, over a period of ten years. The Medical Research Council have advised the Government that in their view there is a strong probability that cigarette smoking provokes carcinoma of the lung. I submit that these figures from Bradford together with those from Siam, Hong Kong, Ceylon, and the Fiji Islands, provide a much stronger case for the thesis that eclampsia is to be attributed to imperfect nutrition together with the disadvantageous mechanical factors associated with pregnancy and the upright position.

Bradford. G. W. THEOBALD.

INFANTILE GASTROENTERITIS

SIR,—I am afraid Dr. Sangster (April 26) has again begged the question of the essential place of *Escherichia coli* in this disease.

All the references (1–5) he gives relate to work prior to 1948, when *Esch. coli neapolitanum* was isolated by Bray. Apart from serotyping, I have yet to see any new fundamental work stemming from this time.

Cow's milk cannot be the whole answer, for the disease occurs in breast-fed infants as well, especially in maternity units.

It is true that intestinal organisms enter by the mouth, but bottle-fed and breast-fed infants do not feed themselves or prepare their food. The question of adult human carriers is surely, therefore, of paramount importance.

I cannot accept that with present-day techniques the problem of isolating a virus, if any, is insuperable. The question of serotyping is merely a refinement which does not invalidate the initial premise.

Even the eminent source of the Royal College of Physicians of Edinburgh publication, to which Dr. Sangster referred, failed to produce any adequate evidence to enlighten our essential ignorance of this intriguing condition.

Ilford Isolation Hospital, Chadwell Heath, Romford, Essex. I. M. LIBRACH.

EFFECT OF HEAT ON SPASTICITY OF DISSEMINATED SCLEROSIS

SIR,—I read with great interest Dr. Lyburn's letter of March 15. I agree with him that in multiple sclerosis the weakness and spasticity are greater in warm weather, and that the patients feel better when it is cool—a mild spring or autumn being their best time. This is in keeping with the fact that excessive movement or massage or permanent confinement to bed is bad for these patients.

Thrombi in the small veins of the central nervous system may be found, according to my observations, in as many as 90% of cases. But I believe they should be regarded as a manifestation of an allergic process. My histological findings in 20 cases of multiple sclerosis [1] seem to correspond fully with the well-known histological picture of neuroallergy as induced in animals or found in man:

(1) hyaline degeneration and fibrous "delamination" of the vascular wall; (2) œdema and swelling of the endothelial cells;

8. Lee, B. *ibid.* p. 801.
9. Ryle, A. *ibid.*
10. Webster's New World Dictionary. New York, 1957.
11. Theobald, G. W. *J. Physiol.* 1934, **81**, 243; The Pregnancy Toxæmias, p. 370, London, 1955.

1. Lehoczky, T. Neuroallergischen Beziehungen in der Histopathologie der multiplen Sklerose. Published by Hungarian Academy of Medicine. Budapest, 1957.

(3) precapillary and capillary dilatation, prestasis, and stasis; (4), capillary and precapillary thrombosis; (5) perivascular infiltration; (6) hæmorrhage; (7) perivascular, perifocal, and diffuse tissue œdema; (8) partial and total necrosis; (9) perivascular parenchyma rarefaction; (10) granuloma formation, and activity of the microglia cells and histiocytes.

These histological changes extend over the whole central nervous system: that is to say, they can be found in parts of the brain or spinal tissue which do not contain plaques. This too is strong evidence of an allergic origin.

Istvan Hospital, Budapest. T. LEHOCZKY.

UNILATERAL RENAL INJURY DUE TO TRANSLUMBAR AORTOGRAPHY

SIR,—The conclusion drawn in Mr. Clark's article (April 12) merits further consideration.

A large quantity of dye was injected, using a mechanical pressure apparatus, directly into the right renal artery. In a recent survey McAfee [1] concluded that the risk of injury to the kidneys depends on the amount of contrast medium reaching them, the instance of complications being trebled if more than 40 ml. of dye was used. The risk of renal damage cannot be entirely eliminated but can be considerably reduced if no more than 25 ml. of contrast medium is manually injected after a small pilot injection is made to localise the needle site with reference to the renal artery.

The new contrast media 'Urografin' and 'Hypaque' may prove less toxic than 'Diaginol'. Furthermore, Mr. Clark gives no evidence to show that the right kidney functioned normally before aortography; urine analysis after the examination showed no abnormal constituents which may have been expected if renal damage had occurred during the examination.

Department of Radiology, United Liverpool Hospitals, Liverpool. AUDREY COUCH
RAYMOND W. GALLOWAY.

CIGARETTE-SMOKING AND DISEASE

SIR,—The rising mortality from lung cancer and coronary thrombosis in older men is rightly described as a smudge on the picture of health in Scotland (April 12, p. 789). Need one look far for the responsible "morbid process"? Surely not: there is enough evidence for a prima-facie case against cigarette-smoking. This addiction is probably also a big factor in Scotland's high morbidity (and mortality) rate from bronchitis.

This report from Scotland should re-emphasise the great need for adequate anti-smoking education. Lung cancer (only one of the lethal complications of smoking) is killing nearly four times as many people as tuberculosis, but there is no corresponding official campaign of prevention. On the contrary, the barrage of tobacco advertising is permitted to continue unchecked, even when it is clearly aimed at adolescents. Political fears about loss of revenue from tobacco taxation are always being emphasised; but what of the decimation of the male smoking population, what of the dollars spent on tobacco, and what of the fires and pit accidents caused by smokers? There are two views to be taken of the financial situation, and Dr. Hugh Dalton did well to remind the House of Commons of this last week.

But there is only one reasonable view of the medical situation: and it is high time the public was bluntly and decisively warned of the dangers. There has been too much medical circumlocution already: the use of such terms as "an association", "a link", "a connection", and even "a cause-and-effect relationship" between cigarette-smoking and lung cancer is too vague. The public still thinks there is some reasonable doubt about it all. There is not, of course; and we should be honest and say: "Most cases of lung cancer are the result of years of cigarette-smoking."

Dr. Beynon (April 12, p. 795) could do a considerable service by advising all *smokers* over 35 years of age in his area to have a twice-yearly chest radiograph. Directly, he would find early cases of lung cancer; indirectly, he would educate the public in one of the dangers of this expensive and harmful form of self-indulgence. He might even provide Mr. Stocker (April 12, p. 797) with some valuable experimental information.

Leicester. J. P. ANDERSON.

THIRST

SIR,—Your annotation on thirst (April 19) seems to confuse measurement of true osmotic values across semi-permeable membranes with an estimate of it obtained indirectly by determining the concentration of solute particles in a solvent—e.g., by estimating freezing-point depression.

Where a solution contains both diffusible and non-diffusible particles these two methods are bound to give different results. Since we have this condition in biological materials, measurement of freezing-point depression is not a valid method for determining osmotic-pressure differences unless allowance can be made for the concentration of diffusible particles. Since urea is believed to be distributed freely through total-body-water it cannot produce an osmotic gradient within the body. If the cells of a "thirst-centre" respond to changes in osmotic pressure they could not be expected to be influenced by changes in concentration of urea.

The exceedingly complex permeability of cell membranes to different molecules and ions makes measurement of the real osmotic gradient in biological material very difficult. Since we cannot readily produce artificial membranes whose permeabilities correspond to those of cell membranes and since the indirect methods of measuring osmotic pressure by freezing point depression and boiling-point elevation are not valid, one has usually to be content with a very crude reproduction of the cell membrane and with measurement of the osmotic gradient across it. Perusal of the literature on osmotic pressure of biological systems makes it obvious that much confusion of thought exists and too often the writers fail to distinguish between the osmotic gradient and the value of the total osmotic pressure based on a method which really measures total concentration of solute particles.

I am also rather astonished that your annotation should state that pure salt depletion can give rise to a sensation of thirst. It is usually considered that thirst is minimal or absent in pure salt depletion.

Glasgow Royal Infirmary. JAS. C. EATON.

*** Dr. Eaton is referring to the difference between, on the one hand, the osmotic pressure of a solution, which, like the freezing-point and the vapour pressure, depends on the concentration of solute particles, and, on the other hand, the "effective" osmotic pressure, representing the osmotic gradient across the cell membrane.

It seems very doubtful whether an osmotic gradient is maintained across all membranes: a difference of osmotic pressure is probably rapidly abolished by a movement of water across the membrane.

The different effects of urea and sodium are probably to be explained by the different permeability of cell membranes to these substances; an increase in the concentration of urea does not affect the water content of cells, but an increase in the concentration of sodium (limited to the extracellular fluid) causes the cells to shrink.

1. McAfee, J. G. *Radiology*, 1957, **68**, 825.

While it seems paradoxical that sodium deficiency should produce thirst, it nevertheless seems to do so,[1 2] if thirst is defined as a desire for water.—ED. L.

NEW METHOD OF PHENOBARBITONE ADMINISTRATION

SIR,—I find it difficult to understand the letters written by Dr. Pearson (April 19) and Dr. Penman (March 29). Dr. Penman states in his opening sentence that "no conclusion whatever can be drawn from the data presented by Dr. O'Connor last week". Dr. Pearson writes that "I cannot agree that Dr. O'Connor has really demonstrated anything".

It appears to me that Dr. O'Connor has demonstrated that when he treated 18 cases of epilepsy with the long-acting phenobarbitone 'Spansules', he virtually cured all the patients he treated. On re-reading Dr. O'Connor's article, I agree that it is open to criticism in many ways. Nevertheless, if we are to believe what he has written, he has shown that with this long-acting phenobarbitone therapy a method has been suggested which may be of great value in the treatment of epilepsy. His work may have been uncontrolled, but he has still demonstrated, even if only as a clinical observation, that all the cases he treated improved to such an extent that the results are really striking. These results surely should not be ignored, even though he cannot explain them satisfactorily. Dr. O'Connor has produced enough evidence to stimulate a trial of delayed-absorption phenobarbitone in epilepsy by others.

London, N.W.3. H. N. LEVITT.

INDIRECT BILIRUBINÆMIA

SIR,—In your issue of April 19, Dr. Schmid and his colleagues comment on our recent report dealing with the reduction of indirect bilirubinæmia. They state that they have not been able to duplicate our results; they suggest that we may be doing harm by driving bilirubin from the blood to the tissues, increasing the risk of brain damage; and they urge all to desist from this therapy until further pharmacodynamic studies of glucuronic acid are carried out.

It goes without saying that all new drugs should be thoroughly tested before clinical use and that they should not be used without due information in regard to their pharmacodynamic action. We might point out, however, that glucuronic acid, although not previously used for this particular purpose, is by no means a new drug. It has been known for two generations and its safe and toxic levels are documented.[3] There are numerous references dealing with its administration to experimental animals and to man.

Our critics do not document the basis of their expressed fear that by lowering the blood-bilirubin we are driving it into the tissues. We have not, to be sure, taken biopsies of the brain before and after glucuronic-acid therapy, but we have observed a diminution of jaundice and biopsies of the subcutaneous fat have shown a reduction in indirect bilirubin coincident with the fall in blood levels.

It would seem that the discrepancy between the results of the Boston workers and our own may be explained by differences in technique. This matter is now being explored. It would seem to us unfortunate if the concern of our Boston colleagues were to result in discontinuance of further studies with this promising therapeutic approach.

STUART DANOFF
CHARLOTTE GRANTZ
AUDREY BOYER
L. EMMETT HOLT, JR.

New York University
College of Medicine.

1. Cizek, L. J., Semple, R. E., Huang, K. C., Gregersen, M. I. *Amer. J. Physiol.* 1951, **164**, 415.
2. Strauss, M. B. *Arch. intern. Med.* 1958, **101**, 216.
3. Artz, N. E., Osman, E. M. Biochemistry of Glucuronic Acid. New York, 1950.

THE ROYAL COMMISSION AND RESTORATION OF GENERAL PRACTICE

SIR,—Lord Moran, in his evidence to the Royal Commission in January, pictured a professional ladder, consultants on the rungs and general practitioners at its foot, pay corresponding. A little later, in *The Lancet* (Jan. 25, p. 216), he wrote of "the very high standard of general practice as he had known it". That the family doctor is not "what he used to be", coming from a leading medical authority and at a time of reduced public esteem, amounts to a professional calamity. The following brief study serves to show that there is sufficient underlying cause for impaired service in the bad conditions of work in general practice. Until these defects are remedied by the Ministry of Health it is imprudent to impugn the professional ability of the doctors.

During the strain of war, the work of general practitioners was a decisive factor in maintaining national physique and morale. Doctors are due to share in the benefits of victory; but the Government leaves them with antiquated machinery to carry on, as best they can, waging their unceasing war against disease and suffering in the community. To strike for better conditions is, naturally, rather repugnant to them as it would cause some interruption in the treatment of their patients.

Conditions in General Practice

The inherent difficulties of day-to-day practice are daunting enough. The doctor's patients are "on his doorstep" or have to be visited in the vicinity. Calls come any time, day or night, and epidemics upset his routine and deprive him of his rest. Whatever the ailment, it has to be diagnosed, the patient satisfied and anxious relatives coped with. Such duties call for all the virtues, a wearing business. A haggling and cheeseparing attitude on the part of the Government towards them is likely to intensify the present grievance of general practitioners.

The bad conditions in practice have persisted since the 1948 Act owing to the complacency of the authorities. They involve patients in avoidable suffering and act as a damper on professional zeal and enterprise. Among glaring examples is the permission of too high a maximum number of patients. This danger is all the greater when modern aids to effective treatment go unprovided. These ancillaries should at least equal standards current in commerce. Technical and secretarial assistance as well as up-to-date equipment are wanted. *Time* for due deliberation is an indispensable ingredient of successful clinical work; and this truth is endorsed by Sir Hugh Watson speaking at and as a member of the Commission[1] when he said, "Assuming that they have the time to do it?" These words reveal a layman's uneasiness about the harassed doctor.

Finally, to gain its ideal objective, the cultivation of a healthy nation, not merely to alleviate disease, the Ministry needs to recognise that general practice is the proper and effective agency. Only the family doctor has access to the intimacies of family life and his instruction on simple principles of the care of the body will be acceptable to parents. The population is now sufficiently educated to cooperate. If the Ministry will include this provision in their functions, it will at last be justified in calling itself a *National Health* service. The cost will be repaid by the gradual elimination of the huge expenditure on sickness benefits and on drugs at present required owing to ignorant abuse of the human body.

1. *Brit. med. J.* Jan. 25, 1958, suppl. p. 31.

Consultant Conditions

This calls for attention, as it proves, by sharp contrast, that the Ministry is quite capable of bettering conditions in the National Health Service.

Consultants spend most of their time in hospitals and, there, great facilities have been added since 1948. Notable is the increased number and range of service of registrars. Further, thanks to a whole host of ancillaries, professional, technical, and clerical, the consultant can increasingly concentrate on his expert duties. Costly complex equipment, too, has been freely supplied. The consultants are now paid for hospital services as well as continuing to enjoy the fruits of private practice which have persisted in substantial measure.

Consultants are well paid and generously equipped with the means of up-to-date service. Family doctors fare badly in both respects. It is not the occasion for discrediting their skill, but rather to commend their steadfast adherence to their exacting duties carried on despite the scant attention to the remedy of bad conditions. It is said that bad workmen complain of their tools; but good workmen won't work with bad ones. The doctor, however, has to do so indefinitely and this although the health of Britain is at stake.

A successful outcome of the work of the Commission depends on radical upgrading of conditions in general practice, not merely relieving the present uneasy situation regarding remuneration.

Bristol. A. WILFRID ADAMS.

INTERMITTENT HYPERPARATHYROIDISM

SIR,—My interest in the paper by Dr. Whitby (April 26) prompts me to stress a few points. As far as I know, only scanty data are available concerning the renal output of calcium in normal persons. But according to my knowledge and own experience, I should consider the urinary calcium output of 265 mg. per 24 hours on an ordinary diet and 150 mg. on a daily intake of 120 mg. as distinctly abnormal. What is important, however, is to follow the calcium output daily and if possible even in a normal control from the same ward and on the same diet. One would then feel more confident about the interpretation of the results.

An early diagnosis of hyperparathyroidism is possible only from a study of the calcium output in the urine. First, when renal function is reduced by calcium deposits, there will be a rise of serum-calcium. There is every reason to believe that hyperparathyroidism in its earliest stage cannot be diagnosed or excluded by serum-calcium determination alone. The data presented by Dr. Whitby evidently show that the correct diagnosis has been made at an earlier stage than usual. But I still consider his case to have been non-intermittent. More extended data would probably have shown this.

St. Joseph's Hospital, Porsgrunn, Norway. A. SCHRUMPF.

THE FUTURE OF THE PUBLIC HEALTH LABORATORY SERVICE

SIR,—As a bacteriologist in the National Health Service I should like to confirm, from my own experience, the criticisms of the conditions of work which are made by "London Bacteriologist" in his letter of April 26.

The masquerade as general pathologist which he mentions can be irritating, but the interference with bacteriological work by pathologists-in-charge, particularly of the know-it-all-clinical-pathologist type, is the more serious matter.

"Provincial Pathologist" in his letter of April 12 advocates a closer integration of the Public Health Laboratory Service with the hospital services. In case anything of the kind does happen in the future, it seems fair to offer to one's bacteriologist colleagues, who may face "integration," a word in season.

HOSPITAL BACTERIOLOGIST.

EFFECT OF RELAXIN ON UTERINE MOTILITY IN VITRO FOLLOWING TREATMENT WITH ŒSTRADIOL AND PROGESTERONE

SIR,—The effect of relaxin on the tissues thought to constitute the target organs for this substance presupposes pretreatment of the animal with œstrogenic hormones. It has been possible to demonstrate this interaction of œstradiol and relaxin both through the biochemical changes induced in the myometrium by these hormonal substances and through the contraction-inhibiting effect of relaxin on the uterus.[1] Steinetz et al.[2] have shown that the hormonal balance between relaxin and progesterone affects the course of delivery in mice.

The reciprocal action between the lipid-soluble ovarian hormones and relaxin may be of decisive importance for an understanding of the significance of relaxin for uterine motility.

The aim of the present investigation has been to study the effect of relaxin upon uterine motility in vitro as influenced by these steroid hormones.

The animals used in the experiments were virgin female rats (weight 200–250 g.) and mice (weight 18–22 g.). The animals were castrated 14 days before starting the injections of the respective steroid hormones. (Œstradiol benzoate ['Ovex B,' Leo]: 1 μg. in 0·05 ml. peanut oil. Progesterone ['Progestin,' Pharmacia]: 1 mg. in 0·08 ml. peanut oil.) The injections were given subcutaneously for 3 days (2 μg. œstradiol and/or 2–2·5 mg. progesterone to the rats, and 1 μg. œstradiol and/or 2 mg. progesterone to the mice in alternating combinations). The relaxin preparations used were firstly an extract with a biological activity corresponding to about 150 guineapig units per mg. and secondly an extract prepared from pregnant sow ovaries by the method of Frieden and Hisaw.[3] The animals were killed on the 4th day by a blow on the head. The test method with in-vitro experiments has been described earlier.[4]

Castrated animals.—The motility pattern of the curves had a typical appearance, with high frequency and low amplitude. Relaxin did not affect the contractions even in relatively large doses (up to 100 μg.; larger doses were not tried).

Animals treated with œstradiol.—Obvious reduction or cessation of the activity with relaxin doses down to 1–2 μg. There was only slight, if any, impairment of tone.

Animals treated with progesterone (these experiments were carried out on rats only).—Relaxin did not affect the spontaneous activity. With 500 μg., however, there was slight impairment of tone.

Animals treated with œstradiol and progesterone.—The spontaneous contractions of the rat uterus were generally reduced in amplitude by relaxin even in very small doses down to 2 μg. In contradistinction to the results after treatment with œstradiol alone, tone was obviously impaired. The corresponding curves from mice showed the motility to be affected to only a minor degree, whereas an impairment of tone was clearly apparent in all experiments. Both the spontaneous activity and the tone impairment were reversible if the doses of relaxin were not too large.

In-vitro experiments after injection of relaxin in vivo.—In a number of experiments mice were treated with œstradiol or œstradiol-progesterone with the same doses as previously. On the 4th day, 3–4 hours before they were killed, the animals were given injections of relaxin in doses varying between 0·8 and 10 mg. subcutaneously in saline solution or 20% polyvidone.

1. Miller, J. W., Kiseley, A., Murray, W. J. *J. Pharmacol.* 1957, **120**, 426.
2. Steinetz, B. G., Beach, V. L., Kroc, R. L. *Endocrinology*, 1957, **61**, 271.
3. Frieden, E. H., Hisaw, F. L. *Arch. Biochem.* 1950, **29**, 166.
4. Wiqvist, N., Paul, K.-G. *Acta endocr., Copenhagen* (in the press).

On the assumption that the increase in the water and glycogen content of the myometrium seen in rats 3–6 hours after the injection of relaxin also occurs in mice, one might within this interval expect that in subsequent in-vitro experiments the uterus would not show any spontaneous activity. However, in all cases the uterus manifested lively spontaneous activity. On the injection of relaxin in vitro there was in animals treated with œstradiol-progesterone no impairment of either the motility or the tone (relaxin doses of up to 100 μg.; larger doses were not tried). In the œstradiol-treated animals the uterus reacted relatively weakly in a few experiments and in most cases practically not at all. Tone remained unaffected.

The results show that, with the doses used, relaxin affects the uterus only when the animals have been pretreated with œstradiol. This has been shown previously by Miller et al.[1] In this respect œstradiol cannot be replaced by progesterone as a relaxin-sensitising steroid hormone.

After pretreatment of the animals with œstradiol and progesterone, there is striking impairment of tone as well as varying reduction of motility. Krantz et al.[5] say that the intravenous injection of relaxin in virgin œstradiol-treated guineapigs " invariably resulted in diminution of tone and spontaneous uterine motility ". Apart from this, I have not been able to find any data concerning the effect of relaxin on uterine tone.

3 hours after a large dose of relaxin injected in vivo the uterus still showed lively spontaneous motility in vitro. The time for the maximum effect on the myometrium of the biochemical and physical changes thus does not coincide with the maximum effect upon the motility. On the other hand, under these circumstances the uterus is refractory to the direct administration of relaxin in vitro as regards changes in tone and motility. As an interesting parallel to this one may mention the effect [6 7] of relaxin upon the uterine motility in women. Relaxin had its most pronounced effect during the proliferative phase, a lesser effect during the phase of secretion, and a very inconsiderable effect in the course of labour. This may be because endogenous relaxin, especially during pregnancy and possibly also during the phase of secretion, has desensitised the myometrium to exogenous relaxin.

Department of Women's Diseases,
Karolinska Sjukhuset,
Stockholm. NILS WIQVIST.

The first relaxin extract was kindly supplied by Dr. R. L. Kroc, Warner-Chilcott Laboratories, and the second by Dr. K.-G. Paul, Medical Nobel Institute, Stockholm.

PURPURIC ERUPTION DUE TO CARBROMAL

SIR,—More cases of drug rash due to carbromal seem to be about.

Carbromal is a capillary-damaging agent, but a relatively weak one, so the purpuric component tends to be unobtrusive and the diagnosis is sometimes missed. The eruption, however, which has been fully described by Borrie,[8] is very constant in pattern and distribution. It appears first on the ankles and spreads slowly up the lower limbs to the buttocks and hips, later involving, if the drug is not withdrawn, the forearms and other parts. There are reddish-brown patches covered generally with fine scales on a background of tiny petechial spots and faint reticulated pigmentation. Itching is variable.

Carbromal has been regarded as innocuous and can be obtained without a doctor's prescription. Apart from tabs. carbromal *B.P.C.* it is contained in various proprietary sedative and sleeping tablets, such as ' Abasin ', ' Adalin ', ' Carbrital ', ' Dormiprin ', ' Dormupax ', ' Persomnia ', ' Noctynol ', ' Relaxa ', ' Sedaltine ', and ' Somnotil '. Some compound remedies also contain carbromal, when their trade names and principal therapeutic purpose may not lead one to suspect its presence. For instance, a patient recently presented with what appeared to be a characteristic carbromal eruption, but I was puzzled because she had not been taking ' Persomnia ' or other sleeping pills that I knew contained carbromal. She had, however, for many months been having ' Hyperysin ' (anti-hypertensive and vasodilator), which I later discovered has a carbromal content of gr. 3 per tablet. This led me for future reference to look up the formulæ of other proprietary preparations and I found a carbromal content, surprisingly, in ' Viredrin ' (compound male hormone tablets), ' Fydalex ' (antispasmodic), ' Menopax Oral ' (œstrogenic compound) and ' Menovo '. There may be others.

London, W.1. E. W. PROSSER THOMAS.

5. Krantz, J. C., Bryant, H. H., Carr, C. J. *Surg. Gynec. Obstet.* 1950, **90**, 372.
6. Posse, N., Kelly, J. *ibid.* 1956, **103**, 687.
7. Kelly, J., Posse, N. *Obstet. Gynec.* 1956, **8**, 531.
8. Borrie, P. *Brit. med. J.* 1955, *i*, 645.

VISITING PARENTS IN HOSPITAL

SIR,—Now that there is widespread agreement that children in hospital should be visited daily by their parents, may I put in a plea for the visiting of ill parents in adult hospitals by their children?

Department of Child Health,
University of Sheffield. R. S. ILLINGWORTH.

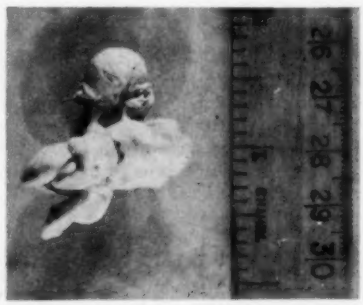
AN UNUSUAL INJURY

SIR,—The following injury seems sufficiently unusual to make it worth recording.

A man, aged 52, was employed as a press operator in charge of an electrically-operated machine making plastic parts by an injection moulding process. The plastic material in the moulding machine was kept at about 450°F (176°C) to keep it sufficiently fluid to enter all parts of the die. At one stage in the process the operator of the machine has to remove the moulded product by putting his hand between the separated valves of the die and, in so doing, across the aperture of the injection nozzle. Safety devices normally ensure that no part of the process, which is almost entirely automatic, can take place while the die valves are separated and the safety gate open.

On the occasion of the injury, the operator had the back of his right wrist opposite the injection nozzle when, for a reason that has baffled the makers of the machine, he suddenly received a forcible injection of semi-solid polystyrene into the back of his wrist.

When admitted to the casualty department shortly afterwards, he was seen to have a knob of solid plastic material, about the size of a pigeon's egg, projecting from the dorsum of his wrist slightly above a line joining the ulna and radial styloid processes. It gave the appearance of the end of a bullet-shaped mass. A radiograph showed a fracture of the distal end of the ulna without displacement, but the object, which was not radio-opaque, could not be made out.



Under a brachial-plexus block an attempt to remove the object by direct pulling was unsuccessful, so an incision was made on either side of the entry hole in the line of the forearm. It was then seen that the plastic material had mushroomed out under the subcutaneous tissues, having met the deeper structures overlying the end of the radius, and had also fractured the end of the ulna.

The photograph of the specimen shows: above, the knob that was projecting from the small entry hole; the central

mushroomed portion grooved on one side by one of the extensor tendons; and, below, the spur which had entered the fracture site in the ulna. The object was shelled out without much difficulty, and, although the subcutaneous tissues were only doubtfully viable owing to the initially high temperature of the plastic, primary closure was attempted. The wrist and forearm were then put in plaster-of-paris splint.

The superficial tissue over the head of the ulna later sloughed, and the defect was covered by Thiersch grafting. There was some residual stiffness of the wrist, but the patient was able to resume work four months after his injury.

I am very grateful to Mr. J. B. Scott for permission to report this case and for his details of the subsequent course of the patient; and to the photographic department of the Royal Berkshire Hospital for preparing the photograph, and the patient's employers for showing me the machinery and technical details related to the accident.

London School of Hygiene and Tropical Medicine, London, W.C.1. E. R. NYE.

Parliament

Supplies of Poliomyelitis Vaccine

ON May 1 Dr. EDITH SUMMERSKILL criticised the Minister of Health for his failure to ensure that adequate supplies of the vaccine were available to carry out even the modest scheme of immunisation which this country was offering. We were, she pointed out, only offering to immunise children from 2 to 15 years of age and expectant mothers, while other countries were offering to immunise all people under 40; and we must remember that two-thirds of the deaths from poliomyelitis occurred among adults not children. While we were offering two injections, in Canada and the United States three were given. She also thought that the Ministry had not publicised the campaign sufficiently. As a result only 40% of the 10 million eligible had registered by the end of February. The choice of vaccine offered—British or Salk—tended to sow seeds of distrust in the minds of ordinary people. The latest figures, at the end of February, showed that of those registered 571,000 had been given one injection and 2,688,000 were still waiting for the first injection. Thousands more were estimated to have registered in March and April. The initial arrangement to buy vaccine from the United States was not made till September, 1957, and the vaccine took six months to produce and test. She considered that the Minister had failed to order sufficient supplies from the United States soon enough. Delays in the preparation of the vaccine had occurred, both here and in America, but these hazards should have been expected.

Mr. DEREK WALKER-SMITH, the Minister of Health, said that the original order for 5000 litres of Salk vaccine was made in September, 1957, as a bridging operation until British supplies should be available. His expert advice had been then, and still was, that British vaccine, when available, was the best and constituted the best long-term basis for our use. At that time, there was every reasonable expectation that 1958 would see mounting supplies of the British vaccine from at least two large and independent sources. Nobody could have foreseen that British production would be almost at a standstill for several months in 1958. To remedy the lack of British vaccine, 2800 litres of Salk were ordered in January, subject to check testing, with the expectation that they would emerge from the tests, if successful, in the course of April and May. These should have been our main source of supply for the present period. But the American and Canadian suppliers had also met difficulties, which with the almost total postponement of British supplies, had caused a major set-back to our programme. In this emergency the Government had asked the Medical Research Council whether, in view of the shortfall of supplies, American and Canadian Salk vaccine which had passed safety tests in the country of origin could be used in this country without further tests. After considering the present situation the M.R.C. had agreed to this as a temporary measure.[1] A million doses of vaccine, part British, part Canadian, had been issued in the last two weeks, and substantial new supplies would now follow hotfoot and would meet the full requirements of the local authorities, not only for those who had already registered but also for those who would register in the coming weeks and months.

The M.R.C., he continued, had advised this relaxation as a temporary measure, and he wanted to make it clear that this opinion in no way derogated from its general view that British vaccine was best, and that in general the greater the sizes and number of samples tested the better. The Government proposed to restore check testing by the M.R.C. at the earliest possible moment, and looked forward to the possibility that one day we could dispense with the need to use any vaccine containing the Mahoney strain, but this day was not yet, because of the present uncertainty surrounding the British supply position. Meanwhile they would proceed with the work in hand on the basis of the M.R.C.'s immediate advice. There still was a right to reject the Salk vaccine if people preferred to wait for the British vaccine. This was logical, since there was, in any event, no obligation on anybody to register for vaccination at all. People would still have this right of refusal if they prefer to wait, either for the British vaccine or for Salk vaccine check tested by the M.R.C. This was a decision which the individual might find hard. But he could take his doctor's advice.

1. The Council's memorandum on this subject appears on p. 1016.

N.H.S. Contributions

THE National Health Service Contributions Act, 1958, received the royal assent on April 30.

QUESTION TIME

Working Party on Hospital Staffing

Dr. DICKSON MABON asked the Secretary of State for Scotland if he would make a statement on his discussions with the Scottish Joint Consultants' Committee.—Mr. JOHN MACLAY replied: It has been agreed that the study of hospital staffing structure will be conducted on a Great Britain basis, and that interim arrangements for senior registrars will be made; the actual arrangements are to be discussed at a further meeting.

Mr. KENNETH ROBINSON asked the Minister of Health if he would widen the membership of the proposed working party on the medical staffing structure of the hospitals to include representatives of bodies other than the Joint Consultants' Committee and his department.—Mr. DEREK WALKER-SMITH replied: I would refer to the answer given by the Secretary of State for Scotland. My right hon. Friend and I are not proposing any change for our part. Mr. ROBINSON: Is the Minister aware that there are those in the profession who believe that the advice he will receive from the Joint Consultants' Committee may not be entirely detached? Does he not think there is at least a case for having one representative of the senior registrars on the working party?—Mr. WALKER-SMITH: This is a joint committee of my right hon. Friend and myself and the Joint Consultants' Committee in cooperation. The Joint Committee consists of representatives of the Royal Colleges, the Scottish Royal Corporations and the British Medical Association. Its composition is a matter for these three bodies, and my right hon. Friend and I cannot interfere with the professional representation on this working party, which is a matter for the profession. Mr. ROBINSON: Is the Minister not aware that those people are all consultants? As well as representatives from the right hon. Gentleman's department and the Joint Consultants' Committee, could not the Minister include one or more representatives of the senior registrars?—Mr. WALKER-SMITH: The composition of the membership of the working party is not yet decided. We shall have to appoint our members, and I will bear in mind what the hon. Member has said. I cannot, however, interfere with the professional representation, which is a matter for the profession.

Mr. ROBINSON asked the Minister if he would instruct the working party on the medical staffing structure of the hospitals

to pay special attention to the understaffing of the mental hospitals and to the need for a substantial increase in the number of psychiatrists in all grades.—Mr. WALKER-SMITH replied: The terms of reference of the working party apply equally to mental and other hospitals and no specific reference seems necessary. Mr. ROBINSON: In view of the fact that this is by far the most undermanned specialty in the whole of the hospital service, does the Minister not think that at least one word on this problem might be included in the terms of reference?—Mr. WALKER-SMITH: The hon. Member can take it that a joint body such as this will be fully aware of all the circumstances relating to the structure and staffing of the mental and mental-deficiency hospitals.

Amenity Beds

Mr. JOHN HALL asked the Minister if he would abolish hospital private beds and replace them by the same or greater number of amenity beds.—Mr. WALKER-SMITH replied: No, Sir.

Mr. HALL: Is the Minister aware that the demand for these amenity beds by those to whom privacy is essential for speedy recovery is far greater than the number available? As a result, they are being forced into private beds at a very great and sometimes extortionate cost? Will he reconsider his decision?—Mr. WALKER-SMITH: I am always prepared to consider proposals both for private or amenity beds where this is possible and where, in the view of the regional hospital board, there is a demand, but there is still a demand for private treatment, and I do not think it would be appropriate to go back on the decision which the House took in this regard in 1946.

Russian Vaccine for Multiple Sclerosis

Mr. FENNER BROCKWAY asked the Minister what information he now had as to the efficacy of the Russian vaccine for multiple sclerosis.—Mr. WALKER-SMITH replied: I cannot as yet add to the replies [1] I gave to questions on this subject on April 21 and 28.

Mr. SOMERVILLE HASTINGS asked the Minister if, after having received the information from Russia that he was now seeking, he would issue a white-paper so that both doctors and the public would have reliable information available.—Mr. WALKER-SMITH replied: I do not think this course would be appropriate since the responsibility for using the vaccine must rest with the doctor, not the patient. I will continue to ensure that any information reaching me is made available to doctors who wish to use the vaccine. Mr. HASTINGS: Could the Minister arrange at frequent intervals that the latest information which he has to hand is provided for the medical profession through his Ministry or through one of the journals, or in any other way he thinks to be appropriate? Mr. WALKER-SMITH: The ordinary method of communicating information to the medical profession is through the medical Press, supplemented, if necessary, in the case of those practising in the National Health Service, by references in *Prescribers' Notes*. I will certainly bear all those matters in mind.

Dr. EDITH SUMMERSKILL: Is it not almost unprecedented for a Minister of Health to pass on to doctors information about a vaccine from a foreign country while at the same time he refuses to undertake any tests of the vaccine?—Mr. WALKER-SMITH: What the hon. Gentleman asked me to do was to make available in a suitable form to the medical profession such information as we have. I must say that I thought that was a very reasonable request, which I said I would try to meet.

Persomnia

Mr. JOHN RANKIN asked the Minister what had been the outcome of his consultations with the Secretary of State for the Home Department about the sale of 'Persomnia' without prescription from a registered medical practitioner.—Mr. WALKER-SMITH: The matter has been referred to the Poisons Board. Mr. RANKIN: Without seeking to rush matters in any way, may I ask the Minister whether he has any idea when the Board will report?—Mr. WALKER-SMITH: I have no precise indication. The Board is an independent statutory body advising the Home Secretary on these matters, and I have no doubt that it is proceeding with the greatest speed which is compatible with thoroughness and efficiency. Mrs. HARRIET SLATER: Is not the Minister aware that the Poisons Board was asked to look at the matter some eighteen months ago?—Mr. WALKER-SMITH: I recognise the hon. Lady's interest in this matter over a period, but I am sure she agrees that although speed is desirable it is essential that we get the best and most authoritative advice on this problem.

1. See *Lancet*, May 3, 1958, p. 971.

New Posts for Senior Registrars

Mr. KENNETH ROBINSON asked the Minister of Health how many specially designated senior registrar posts he intended to approve; what guidance he was giving to regional hospital boards in this matter; and what would be the higher rate of pay attaching to these posts.—Mr. DEREK WALKER-SMITH replied: The number of posts to be approved will be decided on merits after the boards' proposals have been received. I am about to discuss with the Joint Committee the guidance to be sent to the boards. Rates of pay will be a matter for negotiation.

Miners' Boots

Mr. DERICK HEATHCOAT AMORY, the Chancellor of the Exchequer, announced on April 29 that after considering the representations made to him he had decided to restore the exemption from purchase tax of miners' and quarrymen's protective boots and helmets.

Public Health

Vaccination against Poliomyelitis

A FIRST instalment of 2 million doses of Salk vaccine, tested and licensed for issue by the authorities in the U.S.A., is expected to reach this country next week. This will be distributed at once. Further batches of Salk vaccine both from new orders and from the pipeline under existing contracts will be arriving; and, according to the Ministry of Health, "there is every expectation that ample vaccine will be available to enable local health authorities and general practitioners to keep the vaccination programme going at full pressure".

Smallpox in Lincolnshire

ON May 4 a case of smallpox was confirmed at Scunthorpe in Lincolnshire. The patient, a coloured man, working in a local steel works, was taken to Laceby Smallpox Hospital, near Grimsby.

Infectious Diseases in England and Wales

Disease	Week ended April			
	5	12	19	26*
Diphtheria	2	4	1	3
Dysentery	1113	863	1010	927
Encephalitis:				
Infective	6	3	5	3
Post-infectious	2	4	1	3
Food-poisoning	157	112	127	146
Measles, excluding rubella	4194	5066	5095	3916
Meningococcal infection	22	24	33	17
Ophthalmia neonatorum	35	23	23	26
Paratyphoid fever	..	2	4	3
Pneumonia, primary or influenzal	536	585	556	507
Poliomyelitis:				
Paralytic	9	9	15	13
Non-paralytic	..	2	4	8
Puerperal pyrexia	162	244	173	211
Scarlet fever	857	738	600	628
Smallpox	..	..	1	2
Tuberculosis:				
Respiratory	471	459	560	608
Meninges and C.N.S.	3	9	6	12
Other	37	64	56	81
Typhoid fever	5	3	3	6
Whooping-cough	515	495	539	655

* Not including late returns.

Medicine and the Law

Without Prescription

A PATIENT was admitted to hospital on May 13, 1954, suffering from an attack of boils. The house-surgeon in charge of her case ordered a course of streptomycin injections—thirty 0·5 g. injections at intervals of eight hours. The last injection should have been given at 10 P.M. on May 23. In fact, the patient received four more injections than had been ordered, the final injection being given at 6 A.M. on May 25. On May 26 the patient experienced a sense of giddiness, and from that time she lost her sense of balance. She brought an action claiming damages for negligence against the hospital management committee. The committee denied negligence.

Mr. Justice STREATFEILD gave judgment for the patient and awarded her £3000 damages, having found that the ward sister had been negligent. He said that it was impossible to approach the case without a feeling of deep sympathy for the patient; but the sole issue for him was whether negligence had been proved. Though more was known about streptomycin today than in 1954, he had to judge the case through the spectacles of 1954. The matter for decision fell under three heads.

First, had the house-surgeon been negligent in failing to observe the premonitory signs of streptomycin poisoning, or in failing to heed the patient's alleged complaints of giddiness? Secondly, had the nursing staff been guilty of negligence in the same respect? Thirdly, had the ward sister, or the two nurses, been negligent in allowing to be administered, or in administering, the four extra injections?

His Lordship acquitted the house-surgeon and nursing staff of any negligence under the first two heads. Under the third, however, it was said that the ward sister and nurses were in breach of their duty not to administer streptomycin unless such administration was in accordance with the directions of a duly qualified medical practitioner. The two nurses who had administered the four extra injections had done so without reason to suppose that the doses were other than those prescribed by a doctor. Accordingly, they were not negligent.

It was apparent, however, that no precautions had been taken to ensure that the course of injections came to an end at the proper time. For this the ward sister must be held responsible: she alone knew that the four extra injections exceeded the prescribed dose.

But did this amount to negligence in law? It would only be negligence if it could be shown that it was the four extra injections which had caused the damage and if the ward sister ought reasonably to have foreseen that damage might ensue. On the evidence his Lordship was satisfied that it was the final injection that had caused the damage. Accordingly she was guilty of negligence for which the committee could be made vicariously responsible. Had a doctor in fact prescribed the additional injections which had in fact been administered, negligence might well not have been established; but the position differed where there had been no prescription. To hold otherwise would be to deprive the patient of the protection of the trained mind of a doctor which the law sought to give, and possibly to enable a nurse to take it upon herself to administer streptomycin whenever she thought fit.

SMITH *v.* BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. Streatfeild *J.* May 1, 1958. John Harington, Q.C., and Hugh Galpin (Bischoff & Co. for Burnand & Burnand, Hove); Stanley Rees, Q.C., and J. R. Cumming-Bruce (Hempsons).

DAVID CALCUTT
Barrister-at-law.

Diary of the Week

MAY 11 TO 17

Monday, 12th

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12.
4 P.M. Dr. Brian Ackner: Depressive Illness II.

WRIGHT-FLEMING INSTITUTE OF MICROBIOLOGY, St. Mary's Hospital Medical School, W.2.
5 P.M. Prof. J. R. Squire: Hypogammaglobulinæmia—Clinical and Laboratory Studies on the Gamma Globulins.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1.
6 P.M. Dr. Joel Pressman (Los Angeles): Clinical Anatomy of the Larynx in Relation to the Spread of Cancer.

Tuesday, 13th

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1.
5 P.M. Dr. Paul Wood: The Eisenmenger Syndrome, or Pulmonary Hypertension with Reversed Central Shunt. (First of two Croonian lectures.)

UNIVERSITY OF LONDON
5 P.M. (St. Bartholomew's Hospital Medical College, E.C.1) Prof. H. Rocke Robertson (Vancouver): Venous Thrombosis.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.45 P.M. *Experimental Medicine & Therapeutics: Neurology.* Prof. G. Payling Wright, Dr. D. R. Laurence, Prof. E. B. Adams, Dr. A. Crampton Smith: Tetanus.
8 P.M. *Psychiatry.* Dr. Anna Freud: Clinical Studies in Psychoanalysis.

GUY'S HOSPITAL MEDICAL SCHOOL, London Bridge, S.E.1
5 P.M. Prof. A. G. Brom: Recent Developments in Cardiac Surgery. (Carbutt lecture.)

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY, Hammersmith Hospital, Ducane Road, W.12
2 P.M. Prof. W. C. W. Nixon: An Integrated Obstetric Service.

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. R. G. Cochrane: Leprosy.

UNIVERSITY OF BIRMINGHAM
4 P.M. (Medical School): Prof. J. S. Mitchell: Studies in Radiotherapeutics. (First of three William Withering lectures.)

Wednesday, 14th

ROYAL SOCIETY OF MEDICINE
2.30 P.M. *Proctology.* Dr. Ronald Jarman, Dr. Frankis Evans, Mr. Gordon Ramsay, Mr. J. M. Davis, Mr. Innes Williams, Mr. C. I. Cooling: Complications of Excision of the Rectum.

POSTGRADUATE MEDICAL SCHOOL
4 P.M. Prof. Jan Waldenstrom: Carcinoidosis and Some Allied Conditions.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. Lynne Reid: Mucus Secretion in Normal and Morbid Lung.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY
5.30 P.M. Mr. I. R. H. Kramer: Giant Cell Diseases of the Oral Cavity.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Cochrane: Leprosy.

UNIVERSITY OF BIRMINGHAM
4 P.M. Professor Mitchell: Studies in Radiotherapeutics. (Second William Withering lecture.)

Thursday, 15th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Dr. Wood: The Eisenmenger Syndrome, or Pulmonary Hypertension with Reversed Central Shunt. (Second of two Croonian lectures.)

POSTGRADUATE MEDICAL SCHOOL
4 P.M. Prof. G. M. Wilson: Simple and Malignant Goitre.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
8 P.M. Prof. F. S. Dainton: Radiation Chemistry in Retrospect and in Prospect. (Silvanus Thompson lecture.)

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1.
7.30 P.M. Dr. J. R. Audy: The Localisation of Disease, with special reference to the Zoonoses.

HYPNOTHERAPY GROUP
8 P.M. (1, Wimpole Street, W.1): Dr. David Stafford-Clark, Dr. T. A. Kemp, Dr. William Moodie: Anxiety.

NUFFIELD ORTHOPÆDIC CENTRE (Wingfield-Morris Orthopædic Hospital), Oxford
8.30 P.M. Mr. I. S. Smillie: Loose Bodies in Joints.

UNIVERSITY OF BIRMINGHAM
4 P.M. Professor Mitchell: Studies in Radiotherapeutics. (Last William Withering lecture.)

Friday, 16th

UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1). Dr. Ludwik Gross (New York): Viral Aetiology of Mouse Leukæmia—Its Possible Implications for the Problem of Cancer.

ROYAL SOCIETY OF MEDICINE
5 P.M. *Epidemiology & Preventive Medicine with the Fever Group of Society of Medical Officers of Health.* Dr. A. M.-M. Payne (Geneva), Dr. J. C. McDonald: The Asian Influenza Epidemic, 1957.

POSTGRADUATE MEDICAL SCHOOL
10 A.M. Mr. I. S. R. Sinclair: Surgical Aspects of Pancreatic Disease.

ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Dr. R. R. Willcox: Gonorrhœa in Gynæcological Practice.

FACULTY OF RADIOLOGISTS
4.45 P.M. (Royal College of Surgeons, Lincoln's Inn Fields, W.C.2). Prof. D. W. Smithers: Tumours of the Thyroid in Relation to Some General Concepts of Neoplasia. (Knox lecture.)

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY, Chelsea Hospital for Women, Dovehouse Street, S.W.3
4.30 P.M. Miss D. M. Shotton: Pelvic Tuberculosis.

Notes and News

EMPIRE RHEUMATISM COUNCIL

LAST year the Council appealed for £250,000 to finance a ten-year programme of intensified research. This year at the annual general meeting, held in London, Dr. W. S. C. Copeman the chairman, reported that, though £175,000 was still urgently needed, with the funds that had been received the Council's activities had been extended, and the Council had endowed for ten years a new chair of rheumatology in the University of London at the Postgraduate Medical School.[1] The Council has already endowed a chair at the University of Manchester.

Two research fellows have this year completed their work for the Council: Dr. J. K. Norymberski, whose biochemical studies of the steroids are already being put to practical use in measuring chemically the effect of hormone remedies; and Miss I. H. Muir, who isolated chondroitin sulphate, which is present in connective tissue and joints. The Council's trials of drugs continue. Nine centres took part in a three-year trial comparing the long-term effect of cortisone and aspirin in the treatment of rheumatoid arthritis,[2] and a trial of gold therapy for arthritis is at present being carried out at 27 centres. The Council's mobile field unit, which is the only one of its kind in the world, has had an active year; and Dr. J. S. Lawrence, the director, reports the start of two genetic surveys. The first has already produced interesting and unexpected results suggesting that there may be two forms of rheumatoid arthritis, one with and one without hereditary characteristics. Random sample studies show that, contrary to general belief, rheumatoid disease may be present as a disorder of the cervical spine. The second genetic survey, on the relatives of patients with multiple osteoarthritis, is still in its early stages, but preliminary results show a definite familial trend. At the West London Hospital, under Dr. J. D. Robertson, a biochemical test has been adapted to control the use of adrenocortical hormones. As a result it has been found that only initial doses need be high, and that patients may continue their treatment at home under out-patient supervision.

NEUTRALITY OF MEDICINE IN WAR

IN Paris from June 5 to 7, with the President of the Republic as patron, will be held the Congrés International de la Neutralité de la Médicine en Temps de Guerre.

Outlining the policy of the committee, founded in 1952, which has taken the initiative in France, Prof. Charles Richet, its president, says that the first duty of doctors, in war as in peace, is to save life. In the second world war there were some 30 million deaths in Europe, and half of these were "useless": they could have been avoided without affecting the course of events. The measures most important for reducing the brutality of war are those laid down by the International Committee of the Red Cross: enemy prisoners and wounded must be treated as human beings, with humanity, and civilians in occupied regions have the same right to protection as the prisoner-of-war. The Geneva conventions must in future be made more widely known so that they can be less easily violated. In each country a group of doctors and of jurists who understand the conventions should be set up in time of peace, so that they can be sent immediately to places where fighting breaks out. These groups should have a special international status, so that they will be accredited to all nations. At present no country has at its disposal the body of doctors and lawyers whom it would need if it undertook the functions of a protecting Power—well-qualified volunteers who would be capable of taking over key administrative and medical posts in the country at war. Perhaps most important in the long run, an intergovernmental organisation should at once be formed, able to draw on material and economic resources and a pool of medical personnel.

"Take a possible case. Two countries are at war. After a fortnight there are, on each side, 500,000 casualties—wounded, shocked, gassed, burned, infected. How, with only their own doctors, can these countries cope with this situation? How, in a single country, can one find the 30–50 tons of human blood or plasma needed each day? The reserves of dressings and gas-gangrene serum and tetanus serum of one country may well be exhausted in a month. To put it in another way, a country which is medically isolated could not give proper care, in war-time, to more than one casualty in three or four."

Medical aid from outside, given in the spirit of the International Red Cross, with the absolute impartiality which the Red Cross could assure, would relieve much suffering without affecting the outcome of the war and probably without prolonging it by a day. Perhaps the seriously wounded and sick could be taken into hospital in neutral territories, and remain interned until hostilities cease. If, as is possible, the war affected the whole world, the committees of doctors and jurists, with supranational status, would be morally neutral. They would be in the best position to enable our shattered civilisation to survive.

Particulars may be had from the Comité de la Neutralité de la Médicine en Temps de Guerre, 37, rue de Bellechasse, Paris VII.

CANDIED SENIOR REGISTRARS

THE difficulties of senior registrars are at the moment being discussed at the highest level. A more unorthodox but no less discerning approach to their problems has been made by Edward Candy in his novel *The Graver Tribe*.[1] He begins by describing the mixed feelings of disappointment and elation aroused by the appointment of the new surgeon at St. Chad's hospital, and for good measure he includes the extramural problem of a marriage that has gone wrong and the ethical problem of whether it is right to operate on an unwilling patient even to save his life. The reader may well have the uneasy feeling that the matron of St. Chad's is Miss Compton-Burnett in disguise, for both the staff and the patients speak with the stylised formality and devastating frankness of her characters. But Mr. (or is it Dr.?) Candy does not follow her practice of confining melodrama to the wings. St. Chad's is a lively hospital, and a young surgeon there thinks nothing of hurrying from the theatre where he has performed an emergency operation to the medical school where he wields a stomach pump on his alcoholic chief who has just attempted suicide.

PREMATURE MARRIAGE

DELINQUENCY and unhappiness are usually more dramatic, though less pleasant, than uneventful stable behaviour and happiness, and we are apt to forget that the bad publicity which young people too often receive today is earned by a small minority. We are also apt to forget how often the unsatisfactory behaviour of even that small minority may be due to what Dr. John Highet[2] lately described as a "barrage of potentially corrupting adult practices and influences". As examples of these he cited the emphasis on sex, glamour, sumptuousness, and luxury; on force, violence, deceit, and dishonesty; on the philosophy of "anything goes" and "nothing sacred". A recent survey[3] of 400 young people showed that nearly a quarter thought that there was nothing wrong in an engaged couple having sexual intercourse. Again in recent years official reports show that 2 out of every 3 first babies born to brides aged sixteen to nineteen were conceived out of wedlock. These extramarital conceptions are one reason for the present trend toward earlier marriage. In Scotland 1 bride in 7 is under twenty and 1 in 4 is under twenty-one, while the proportions are even higher in England. But many of these young people freely choose to marry young, perhaps understandably in view of the emphasis which is laid on sex in the world in which they live. Another factor in Dr. Highet's view is what he terms the "irresponsible" recommendation of early marriage by some doctors. This recommendation, he suggests, is based solely on the ground that it is best for a young woman to start her

1. 21st annual report of the Empire Rheumatism Council, Faraday House, 8, Charing Cross Road, London, W.C.2.
2. See *Lancet*, 1957, ii, 1327.

1. London: Gollancz. 1958. Pp. 204. 12*s*. 6*d*.
2. In an address to the Scottish branch of the Red Cross Society on March 29. Dr. Highet is lecturer in sociology in the University of Glasgow.
3. Church of Scotland Youth Committee. Youth at Leisure. Edinburgh, 1956.

family as early as possible. But there is another side to the picture, and he believes that it would be a real service to point out to young people that it has been estimated [4] that, if recent trends continue, then on the average 1 in 4 of the girls now marrying between sixteen and eighteen years of age will have been divorced by the twentieth anniversary of their marriage, compared with 1 in 10 marrying between nineteen and twenty-two and 1 in 16 marrying between twenty-three and twenty-seven.

MARGARET DE SOUSA DEIRO FUND

The scope of this fund, which was set up to help indigent gentlewomen with early pulmonary tuberculosis, has lately been widened by an order of the Charity Commissioners, and the trustees may now apply any income not needed for the original purpose to the care, reablement, and aftercare of indigent women with pulmonary tuberculosis or any other disease of the chest.

The fund can make grants to cover the cost of treatment, when this cannot be carried out in suitable conditions under the National Health Service, and grants towards convalescent holidays after institutional treatment. In approved cases the trustees can also give financial help for reablement and convalescence. By its constitution the fund is unable to help patients with chronic illness who have no prospect of returning to employment. Further particulars and application forms can be had from the trustees, 1, New Court, Carey Street, Lincoln's Inn, London, W.C.2.

MEDICAL FILMS

A NEW film, *The Treatment of Sports Injuries* (16 mm., sound, colour, 22 minutes, Great Britain, 1957), is of special interest to school doctors and those associated with sports clubs.

The film opens with the statement that most sports injuries, given adequate first-aid, treatment, and rehabilitation, recover rapidly. The causes of injuries are direct and indirect trauma, strong muscular contraction, and postural strain; and their treatment consists primarily in the control of bleeding and support of the injured part. Recovery depends as much on the effort of the patient as on the treatment by the doctor. The management of a sprained ankle is shown in detail. The second half is devoted to specific lesions, including knee injuries sustained in cricket, ski-ing, and football, tennis-elbow, and a tear of the hamstring muscles of athletes. The film ends with a summary and a call for closer cooperation between the doctor, the hospital, and the trainer of sportsmen, not only in the treatment, but also in the prevention of injuries.

Although some may disagree with certain details of treatment, the principles are sound and the emphasis on home exercises and on the value of supervising correct posture during training is noteworthy.

Copies of the film are available, free of charge, from T. J. Smith & Nephew, Ltd., Medical Department, Neptune Street, Hull.

The Grand Rounds—1. Acute Abdominal Problems (16 mm., sound, black and white, 57 minutes, U.S.A., 1956) is one of two film records of American television discussions now available in this country. Three abdominal surgical problems are considered.

The first case was of a man with a long history of asthma and bronchitis, severe scoliosis, and upper abdominal pain of recent onset. Film taken when he was admitted to hospital was shown and radiographs and laboratory findings were presented. After discussion by the panel of various diagnoses, film taken at operation was shown, and the results and postoperative course were debated. The second case was a man who had been admitted with an inflammatory condition of his face and an upper respiratory infection. He had subsequently collapsed and a mass was detected in the left upper quadrant of his abdomen. The diagnosis was discussed and the results of laparotomy are revealed. The third case was of a man, aged 71, with a long history of peptic ulcer and increasing pyloric obstruction who had been admitted to hospital two weeks previously with a perforation of his ulcer. This had been treated conservatively with success until that morning when the patient had had a severe hæmatemesis. The ensuing discussion dealt with the conservative treatment of perforations—described as "widely practised in England"—the effect of long-continued gastric intubation, the incidence of hæmorrhage as a complication of perforations in the elderly, and the course to be followed in this case.

4. Registrar-General's Statistical Review of England & Wales, 1946–50, Text: Civil, p. 66.

This is an interesting record from which some valuable diagnostic points may be gleaned. The discussion by the experts is lively and stimulating, and Dr. Leo G. Rigler's analyses of the X rays are informative.

In the second film, *The Grand Rounds—2. The Cardiac Patient in Stress, Work, Surgery, Pregnancy* (16 mm., sound, black and white, 90 minutes, U.S.A., 1956), a further three cases are discussed.

The first case was of a man who four and a half years earlier had been admitted with upper abdominal distress for cholecystectomy, but had had a cardiac infarction before the operation. After the panel had discussed the argument for elective cholecystectomy, the patient was taken to the operating-theatre, where the anæsthetist discussed the anæsthesia for such a case. A debate on postoperative management followed. The second case was of a woman, aged 35, in the fourth month of her seventh pregnancy with signs of mitral and aortic stenosis. Her heart sounds were demonstrated with an amplifying stethoscope and her radiographs were shown. The panel discussed various aspects of cardiac disease in pregnancy and labour. The third case, of a man with a cardiac infarction, stirred up a provocative discussion on management of cases in which opposing views were expressed by Dr. Sam Levine and Dr. Paul Dudley White.

These films are well worth showing to any group of physicians and surgeons, and medical students may find the diagnostic problems useful.

They may be borrowed, free of charge, from Upjohn of England, Ltd., 4, Alford Street, London, W.1.

University of Cambridge

On April 26 the following degrees were conferred:

M. Chir.—I. W. Broomhead, *W. K. Douglas.
M.B., B.Chir.—*A. D. H. Pooler.
M.B.—J. N. Stenhouse.

* By proxy.

Guy's Hospital Medical School

Prof. A. G. Brom will deliver the Carbutt lecture on Tuesday, May 13. He is to speak on recent developments in cardiac surgery. Dr. Hugh B. Cott will give the Fison lecture on Friday, May 30. His subject will be protective coloration in animals. Both lectures will be held at 5 P.M. at the school, London Bridge, S.E.1, and tickets may be had from the dean.

Charing Cross Hospital Medical School

Sir Howard Florey will deliver the Huxley lecture at the school, Chandos Place, London, W.C.2, at 5.30 P.M., on Thursday, May 22. He will speak on the changing emphasis in medical research.

Institute of Cardiology, London

Dr. Howard Burchell of the Mayo Clinic, Rochester, Minnesota, will give the St. Cyres lecture for 1958 at 1, Wimpole Street, W.1, on Wednesday, June 4, at 5 P.M. He is to speak on pulmonary hypertension in congenital heart-disease.

Ciba Foundation

The trustees of the Ciba Foundation are offering in 1959 not less than five awards (£300 each) for investigations into the basic problems of ageing. Entries must reach Dr. G. E. W. Wolstenholme, director of the foundation, 41, Portland Place, London, W.1, not later than Jan. 1, 1959.

The Foundation's lecture on research on ageing will be given this year by Prof. F. Bourlière of the Laboratoire de Physiologie, Faculté de Médecine de Paris, on Thursday, June 19, at 5 P.M., at the Royal Institution, 21, Albemarle Street, London, W.1. He is to speak on the comparative study of age changes.

Simpson-Smith Prize

As the subject for this prize for 1959 the Institute of Child Health has chosen Spina Bifida.

The prize (100 guineas) is open to men and women from the British Commonwealth or the Republic of Ireland who are engaged in the practice of surgery. A copy of the rules can be had from the secretary of the Institute, The Hospital for Sick Children, Great Ormond Street, London, W.C.1. Essays must be submitted not later than Dec. 31, 1959.

International Congress of Clinical Pathology

This congress will be held in Madrid from June 13 to 17, 1960. Further particulars may be had from Dr. José Aparicio Garrido, Facultad de Medicina, Pabellón Nr. 2, Ciudad Universitaria, Madrid.

Marlborough Day Hospital

On Monday, May 19, at 8.15 P.M. at the hospital, 38, Marlborough Place, London, N.W.8, Dr. E. M. Bluestone, formerly director of Montefiore Hospital, New York, will speak on social psychiatry.

Work Study in the Hospital Service

The Chartered Society of Physiotherapy is arranging a conference on this subject, to be held on Oct. 17 and 18 at the Westminster Medical School, S.W.1. Further particulars may be had from the secretary of the society, Tavistock House (South), Tavistock Square, W.C.1.

Royal Institute of Public Health and Hygiene

Dr. B. G. B. Lucas will give the Bengué lecture for 1958 on Oct. 20, at 5 P.M. His subject will be artificial aids in the control of the circulation. Brigadier J. S. K. Boyd will give the Blackham lecture for 1958 on Tuesday, Nov. 11, at 4 P.M. on yellow fever and its prevention. Both lectures will be given at the institute, 28, Portland Place, London, W.1.

Centenary of Babinski

The Société Française de Neurologie, at its Réunion Neurologique Internationale in Paris on June 2, is celebrating the centenary of the birth of J. Babinski.

The president, Prof. Raymond Garçin, will speak on Babinski's work, Sir Francis Walshe on his place in modern neurology, and A. Tournay on Babinski the man. The two ensuing days will be devoted to a symposium on the cerebellum.

Legislation on Mental Health

Opening the annual conference of the Institute of Hospital Administrators in London on May 4 (*The Times*, May 5), Mr. Derek Walker-Smith, the Minister of Health, reaffirmed the Government's acceptance of the need to revise the law relating to mental health. They intended, he said, to promote legislation as soon as possible, though not in the current session of Parliament. He hoped that from the discussions on the Royal Commission's recommendations there would emerge a new and improved pattern of hospital administration.

College of General Practitioners

Applications are invited, before Sept. 1, from members of the college for not less than fifteen Upjohn travelling fellowships of up to £200 each in value.

The object of these fellowships is to enable general practitioners to undertake postgraduate study (for at least two weeks) at their old teaching hospitals or at any other hospitals, clinics, health centres, or general practices of their choice. They are to be presented annually, by Messrs. Upjohn of England Ltd., to members of the college who are in active general practice in the United Kingdom or Eire. Further particulars may be had from the secretary of the college, 41, Cadogan Gardens, London, S.W.3.

Royal Commission on Remuneration

The Royal Commission on Doctors' and Dentists' Remuneration were taking evidence last Thursday, May 8, from representatives of the Society of Medical Officers of Health and the Association of County Medical Officers of Health of England and Wales.

On May 15, representatives of the Medical Research Council, and the Committee of Vice-Chancellors and Principals of the Universities of the United Kingdom have been invited to attend.

A 16 mm. film, entitled *The Hypnotic Treatment of Psychogenic Illness*, has been made at Belmont Hospital, Sutton, Surrey. It may be borrowed free of charge by hospitals and medical societies on application to the group secretary at the hospital.

Dr. H. Seaward Morley has been appointed a member of the council of the Board of Registration of Medical Auxiliaries.

The flag day for the National Association for Mental Health and the Mental Health Research Fund joint appeal will be held this year on Tuesday, July 8, in the Metropolitan boroughs.

A symposium on carcinoma of the lung was held by N.A.P.T. in London last November; the proceedings have been published as a booklet (pp. 48, 6*s*.) obtainable from N.A.P.T., Tavistock House North, Tavistock Square, London, W.C.1.

The Bishop of St. Edmundsbury and Ipswich will dedicate a memorial garden at Golders Green Crematorium to the memory of the late Lord Horder on May 30, at 3 P.M. Invitations may be had from the secretary, The London Cremation Company Ltd., 45, Nottingham Place, London, W.1.

The United Hospitals' Choir, which rehearses on Thursday evenings at St. James's and St. Peter's School, Great Windmill Street, London, W.1, invites new members to join. Further details may be had from the secretary, Miss J. Magrath, 18, West Side, Clapham Common, London, S.W.4.

The annual dinner of the Indian Medical Service Dinner Club will be held at the East India and Sports Club Limited, St. James's Square, London, S.W.1, on Friday, June 13, at 7.30 P.M. Tickets may be had from the secretary of the club, Medical Board Room, Commonwealth Relations Office, Matthew Parker Street, S.W.1.

St. John's Wood Church, London, N.W.8, has chosen this year as the theme of its World Church weekend, on May 10 and 11, the Church and Disease. The speakers will include Dr. Desmond O'Neill, and the programme ends with a discussion on "What's it got to do with me?" in which a surgeon, a general practitioner, a children's officer, and a committee member of the St. Marylebone Almshouses and Housing Associations will take part.

The first issue of *District Nursing*, the official journal of the Queen's Institute of District Nursing, has appeared. The new publication, which has taken over the old *Queen's Nurses' Magazine* with a view to developing its scope, intends, in its own words, "to meet the needs of the technical and administrative worker in the domiciliary health field". It is to be published monthly and costs 1*s*. The editorial offices are at 57, Lower Belgrave Street, London, S.W.1.

CORRIGENDA: *Slough Industrial Health Service.*—In a note on April 26 (p. 917) we stated that the occupational hygiene service was controlled jointly with the London School of Hygiene and Tropical Medicine. We are informed that control now rests wholly with the Slough Industrial Health Service.

Fat-mobilising Activity of Human Urine.—In fig. 3 of the article by Dr. T. M. Chalmers and his colleagues (April 26, p. 866) the specific activity as percentage of control was mean ± 2 S.E.M. and *not* mean $\pm$ S.E.M.

Appointments

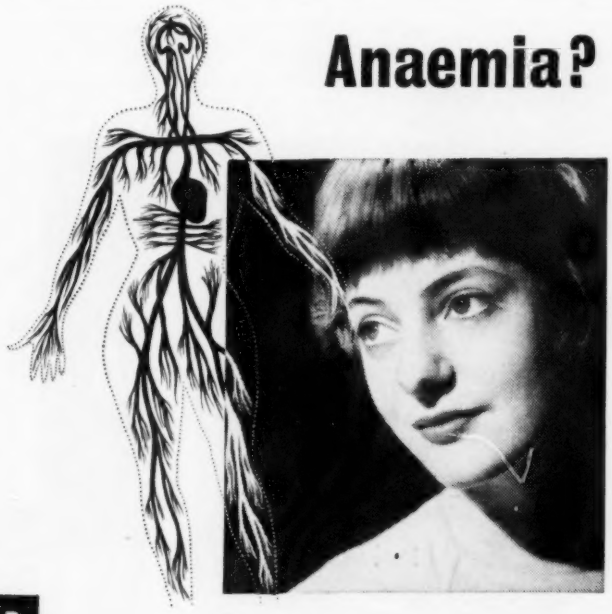
BARTLET, J. E. A., M.D. Aberd., M.R.C.P., D.P.M.: consultant psychiatrist and medical superintendent, Exminster Hospital, near Exeter.
DAVIDSON, A. L. M., M.B. St. And.: senior casualty officer, County Hospital, Lincoln.
FOSTER, J. C., M.B. Edin., F.R.C.S.E.: orthopædic surgeon (S.H.M.O.), East Cumberland group of hospitals.
LEONARD, T. F., M.B. N.U.I., D.P.H.: assistant M.O. and school M.O., Warrington.
PAGAN, R. T., M.B. Lond.: assistant M.O.H. and school M.O., Smethwick.
SCHOFIELD, C. B. S., M.D. Durh.: assistant venereologist (S.H.M.O.), Newcastle upon Tyne group of hospitals.
SHARP, C. J., M.B. Leeds, D.O.: assistant ophthalmologist (S.H.M.O.), Sunderland and Hartlepools group of hospitals.

Manchester Regional Hospital Board:

GORDON, N. S., M.D. Edin., M.R.C.P.: consultant neurologist, Booth Hall Hospital, Manchester, and Royal Children's Hospital, with additional duties at David Lewis Epileptic Colony, Cheshire, and Preston Hospital Centre.
HALNAN, K. W., M.D. Cantab., F.F.R., D.M.R.T.: assistant radiotherapist (S.H.M.O.), Christie Hospital and Holt Radium Institute.
SHERRAH-DAVIES, EVAN, M.B. Cantab., F.R.C.S., D.M.R.T.: consultant radiotherapist, Christie Hospital and Holt Radium Institute.

Welsh Regional Hospital Board:

ANSARI, A. H., M.A. Cantab., M.R.C.S., D.M.R.D.: consultant radiologist based at Royal Gwent Hospital, Newport.
BIHARI, JULIAN, M.B. Lond., F.R.C.S., D.L.O.: consultant E.N.T. surgeon, Mid-Glamorgan H.M.C. area.
HOWELL, R. G., M.B. Oxon., M.R.C.P.: consultant dermatologist based at Neath General Hospital, Glamorgan.
PILLAI, SUNDRAM, M.B. Rangoon, F.R.C.S., D.O.M.S., D.L.O.: consultant ophthalmologist, West Wales H.M.C. area.



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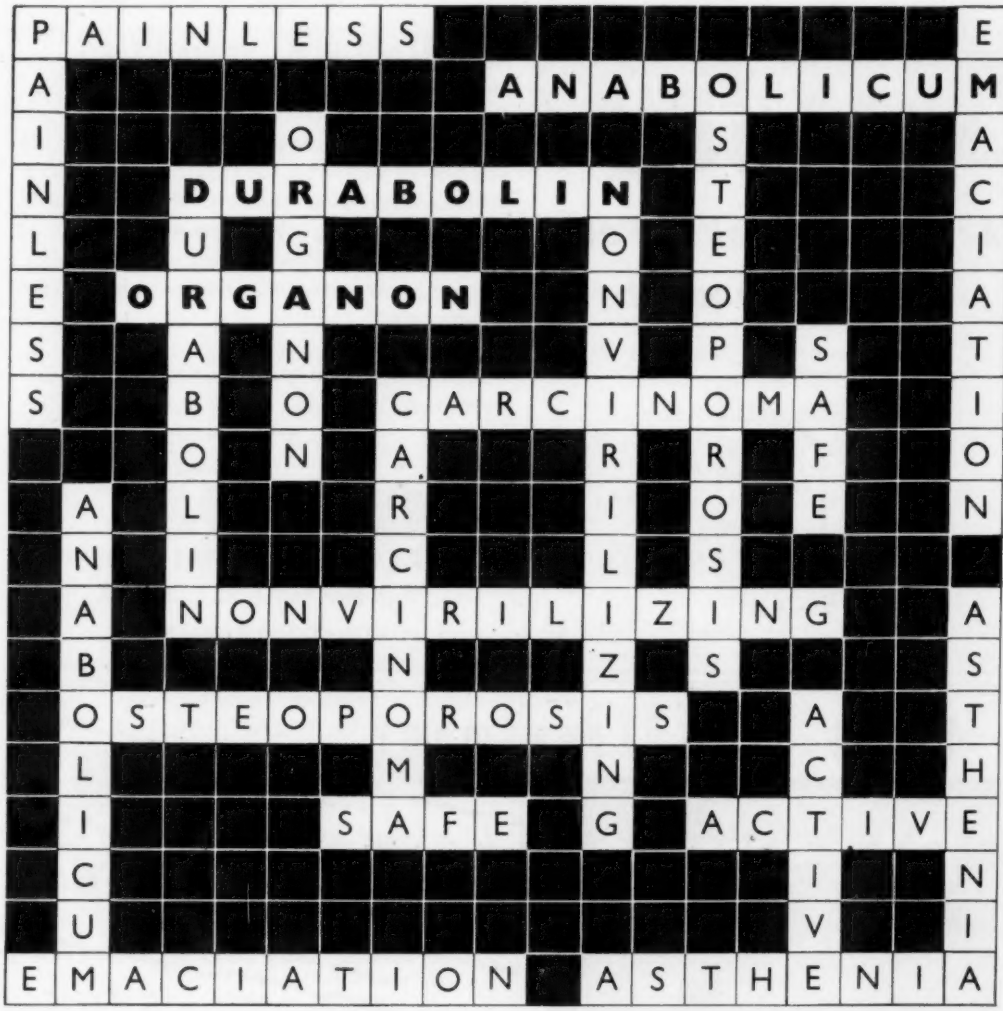

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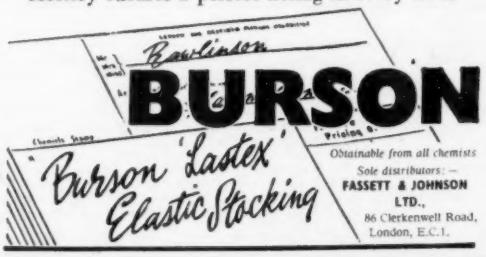

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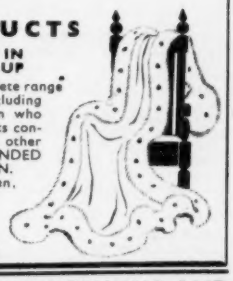

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16th July
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BRITISH ASSOCIATION OF PHYSICAL MEDICINE

A WEEK-END COURSE designed primarily for those taking the Diploma in Physical Medicine will be held on 27th, 28th and 29th June, 1958.

Further details can be obtained from the Honorary Secretary of the Association, 47, Lincoln's Inn-fields, London, W.C.2.

UNIVERSITY OF LONDON

A LECTURE entitled "Viral Ætiology of Mouse Leukæmia. Its Possible Implications for the Problem of Cancer" will be delivered by Dr. L. GROSS (New York) at 5.30 P.M. on 16TH MAY at the London School of Hygiene and Tropical Medicine, Keppel-street, Gower-street, W.C.1

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

UNIVERSITY OF LONDON

A LECTURE on "Venous Thrombosis" will be delivered by Professor H. ROCKE ROBERTSON (British Columbia) at 5 P.M. on 13th MAY at St. Bartholomew's Hospital Medical College (Physiology Lecture Theatre), Charterhouse-square, E.C.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

THE WRIGHT-FLEMING INSTITUTE OF MICROBIOLOGY

ST. MARY'S HOSPITAL MEDICAL SCHOOL, LONDON, W.2

The FOURTH ALMROTH WRIGHT LECTURE will be given by Dr. R. G. WHITE, M.A., D.M., London Hospital Medical College, in the lecture theatre of the above Institute on MONDAY, 19TH MAY, at 5 P.M.

Subject: "Cellular Aspects of the Immune Response."

The lecture is open to all members of the medical profession and to all students in medical schools without fee.

THE UNIVERSITY OF BIRMINGHAM

FACULTY OF MEDICINE

WILLIAM WITHERING LECTURES, 1958

Prof. J. S. MITCHELL, C.B.E., M.D., PH.D., F.R.S., F.F.R. (Regius Professor of Physic, University of Cambridge, and Honorary Director, Radiotherapeutic Centre, Addenbrooke's Hospital, Cambridge), will deliver the William Withering Lectures in the large anatomy theatre of the medical school on TUESDAY, WEDNESDAY, and THURSDAY, 13TH, 14TH, and 15TH MAY, 1958, at 4 P.M. each day.

Subject: "Studies in Radiotherapeutics."

Members of the medical profession and students of medicine are invited to attend.

April, 1958. A. P. THOMSON, Dean.

MENTAL HEALTH RESEARCH FUND FELLOWSHIPS

Applications are invited for MENTAL HEALTH RESEARCH FUND FELLOWSHIPS from suitably qualified persons wishing to pursue Full-time Research Work bearing on problems of mental health whether in clinical psychiatry or in one of its supporting sciences.

Both Junior and Senior Fellowships are offered in the salary ranges £700–£1200 and £1200–£2000, plus superannuation. The appointments will be for up to 3 years in the first instance.

Application forms, which must be returned before 1st October, 1958, may be obtained, together with further information, from the Secretary, Research Committee, Mental Health Research Fund, 39, Queen Anne-street, London, W.1 (Tel.: WELbeck 1272).

NATIONAL HEART HOSPITAL

Westmoreland-street, W.1, and Buckingham

The ST. CYRES LECTURE for 1958 will be delivered in the Barnes Hall of the Royal Society of Medicine, 1, Wimpole-street, W.1, on WEDNESDAY, 4TH JUNE at 5 P.M., by Dr. HOWARD BURCHELL, of the Mayo Clinic, Minnesota, U.S.A.

Subject: "Studies of Pulmonary Hypertension in Congenital Heart Disease."

Members of the medical profession are cordially invited.

POSTGRADUATE COURSE IN INDUSTRIAL OPHTHALMOLOGY

To be held at the BIRMINGHAM AND MIDLAND EYE HOSPITAL
6TH–10TH OCTOBER, 1958

The Course is for Ophthalmologists and Industrial Medical Officers but is open to all medical practitioners. It will include clinical demonstrations, lectures in industrial diseases and injuries, also visits to local factories and to the Burns Unit of the Birmingham Accident Hospital.

Fee £5 5s. for the full course; £2 12s. 6d. for morning sessions only.

Syllabus can be obtained from the Secretary, Industrial Ophthalmology Course, Birmingham and Midland Eye Hospital, Church-street, Birmingham, 3.

THE ROYAL SOCIETY

SCIENTIFIC PUBLICATIONS GRANTS

Applications for Grants from the first allotment of the Government Grant for Scientific Publications for the year 1958 should be made as soon as possible. No application can be considered which is received later than 15th June, 1958. This grant is provided for the assistance of scientific publications in the United Kingdom, particularly but not exclusively those of scientific societies and institutions of a national character. A small part of the grant is available for the assistance of the libraries of scientific societies. Applications are receivable only from societies and institutions in the United Kingdom and individuals of British nationality.

Applications will be considered at the same time for grants from funds made available by the Wellcome Trust for the support of publications dealing with research in the field of medical and allied sciences.

Forms of application may be obtained from the Assistant Secretary, The Royal Society, Burlington House, London, W.1.

L.M.S.S.A.

FINAL EXAMINATION: MEDICINE and SURGERY, 9th June, 14th July, 11th August, 1958. MIDWIFERY and PATHOLOGY, 10th June, 15th July, 12th August, 1958. MASTERY OF MIDWIFERY, May and November. DIPLOMA in INDUSTRIAL HEALTH, July and December.

For regulations apply REGISTRAR, Apothecaries Hall, Black Friars-lane, London, E.C.4.

THE LISTER INSTITUTE OF PREVENTIVE MEDICINE. Applications are invited for the post of ASSISTANT VIROLOGIST to the Trachoma Research Group of the Medical Research Council. The work will involve research into the behaviour of trachoma virus in eggs and tissue culture and may also include serological investigations. The salary will be within the range £780–£1130 p.a., plus family allowances, the starting-point being determined by qualifications and experience. Applicants preferably should have some postgraduate experience in virology or bacteriology.

Applications should be sent to the Director, Lister Institute of Preventive Medicine, Chelsea Bridge-road, London, S.W.1.

UNIVERSITY OF LONDON. The Senate invite applications for the READERSHIP IN PHARMACEUTICS tenable at the School of Pharmacy (salary scale £1475–£1775–£2150 a year plus £80 London allowance).

Applications (10 copies) must be received not later than 3rd June, 1958, by the Academic Registrar, University of London, Senate House, W.C.1, from whom further particulars may be obtained.

UNIVERSITY OF LONDON. Application is invited for the LAURA DE SALICETO STUDENTSHIP (part-time) for the Advancement of Cancer Research, value £150 a year for not less than 2 years.

Applications should reach the University not later than 1st June, 1958. Further particulars may be obtained from the Secretary to the Scholarships Committee, University of London, Senate House, London, W.C.1.

UNIVERSITY OF LONDON KING'S COLLEGE will require on 1st October, 1958, a LECTURER IN PHYSIOLOGY. The appointment will be on the Junior Lecturer scale of £850–£50–£1050, plus £60 London allowance, family allowances and F.S.S.U. benefits.

Particulars and application forms should be obtained from the Registrar, King's College, Strand, W.C.2. Completed applications should reach him by 30th May.

UNIVERSITY OF OXFORD. Radcliffe Infirmary. Applications are invited for the post of GRADUATE ASSISTANT IN BACTERIOLOGY. The successful applicant will be required to take part in the teaching of bacteriology to clinical students and to assist in the routine clinical bacteriology laboratory. Salary will be in the scale £900–£50–£1600, according to qualifications and experience, with family allowance and F.S.S.U. Duties to commence as soon as possible after appointment.

Applications, together with the names of 2 referees, should be sent, not later than 31st May, 1958, to Dr. R. L. VOLLUM, Radcliffe Infirmary, Oxford.

UNIVERSITY OF DUBLIN. Trinity College. Applications are invited for whole-time positions as JUNIOR PATHOLOGISTS. The salary will be in the range £665–£47 10s.–£950 p.a. The officers will participate in a non-contributory insurance pension scheme.

Further information may be obtained from the Registrar, Trinity College, Dublin, who will accept applications until 14th June, 1958.

UNIVERSITY OF CAMBRIDGE. Applications for the post of ASSISTANT IN RESEARCH in the Department of Human Ecology vacant from 1st October, 1958, or as soon as possible thereafter. The person appointed will be expected to engage in research in the field of national and international vital statistics and to give assistance with the design and analysis of a wide range of medical research projects. Applicants should be graduates in mathematics, mathematical statistics, or statistics; those expecting to graduate in the coming summer will be considered. Salary scale £650–£25–£850 with superannuation benefits and family allowance where applicable.

Further particulars and information may be obtained from Dr. G. A. GRESHAM, Secretary of the Appointments Committee of the Faculty of Medicine, The Medical School, Tennis Court-road, Cambridge, to whom applications should be sent to reach him not later than 30th July, 1958.

UNIVERSITY COLLEGE OF SOUTH WALES AND MONMOUTHSHIRE. Applications are invited for the post of LECTURER or ASSISTANT LECTURER IN PHYSIOLOGY. Salaries will be in the scale :—

Lecturer—£900–£100–£1650 p.a.

Assistant Lecturer—£900–£100–£1250 p.a.

The commencing salary will be fixed according to qualifications and experience.

Applications (6 copies), containing the names of 3 referees, should reach the Registrar, The University College of South Wales and Monmouthshire, Cathays Park, Cardiff (from whom further particulars can be obtained) not later than 31st May, 1958.

Hospital Services: Senior Appointments

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. 2 ASSISTANT PSYCHIATRISTS each of 5 half-days a week (Senior Hospital Medical Officer grade), Tavistock Clinic, 2, Beaumont-street, W.1

Good general experience in psychiatry, training in psychoanalysis and experience in psychoanalytic methods, especially group therapy and supervision of casework of allied professional groups, required. D.P.M. an advantage. Clinic may be visited by direct appointment.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, before 9th June, 1958.

ROYAL FREE HOSPITAL. Applications are invited from registered medical practitioners for the appointment of Part-time CONSULTANT SURGEON to the E.N.T. Department. Applicants must be Fellows of the Royal College of Surgeons (England). Appointment to commence 1st October, 1958. Salary and conditions of service in accordance with those laid down by the Ministry of Health.

Applications, giving details of experience and accompanied by the names of 3 referees, should be sent to the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, not later than 7th June, 1958.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1. Applications are invited for the appointment of Part-time CONSULTANT NEURO-SURGEON (3 sessions a week). Candidates should have a special interest in spinal surgery, and duties will include the care of patients with head injury admitted to the Accident Unit at the Country Hospital.

Applications (1 copy), giving date of birth, qualifications and experience, and names of 3 referees, to be addressed to the House Governor by 14th June, 1958.

ST. BARTHOLOMEW'S HOSPITAL, E.C.1. Applications are invited for the post of Part-time SENIOR HOSPITAL MEDICAL OFFICER in the Department of Venereal Diseases. The appointment is for 6 sessions weekly and is tenable from a date to be arranged.

Applications (12 copies), together with the names of 3 referees, should be submitted to the undersigned within the next 14 days.

C. C. CARUS-WILSON, Clerk to the Governors.

ST. GEORGE'S HOSPITAL, S.W.1. Applications are invited for the post of FIRST ASSISTANT in General Surgery. The duties of this post will include experimental work in cardiac surgery. The successful candidate will be required to take up duty on, or as soon as possible after, 1st June, 1958.

Applications, stating age, education, qualifications, experience, and the names and addresses of 2 referees, should reach the undersigned not later than Saturday, 24th May, 1958.

P. H. CONSTABLE, House Governor.

SOUTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD. Applications are invited for the whole-time appointment of CONSULTANT PSYCHIATRIST AND RESIDENT PHYSICIAN-SUPERINTENDENT at Bexley Hospital, Dartford Heath, Bexley, Kent. The house and appointment will be available from 1st September, 1958. Candidates should possess a D.P.M. and preferably a higher qualification; psychiatric hospital and outpatient clinic experience is essential, and candidates should also have had experience in modern psychiatric therapeutic procedures, including psychotherapy and occupational therapy. Applicants may visit the hospital.

Applications, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to be sent to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 31st May, 1958.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for appointment as CONSULTANT PHYSICIAN of Junior status for duty initially at the Liverpool Stanley Hospital. The appointment is for 4 notional half-days a week. Candidates must possess a registrable qualification and F.R.C.P. or M.R.C.P. of London.

Detailed applications, giving full particulars of age, qualifications, &c., present and previous appointments, and the names of 3 referees, should reach the Secretary, 80, Rodney-street, Liverpool, 1, by 17th May, 1958.

LIVERPOOL REGIONAL HOSPITAL BOARD. Ormskirk GROUP. Applications are invited for the post of Whole-time ASSISTANT PATHOLOGIST (Senior Hospital Medical Officer) in the above Group. Applicants should have general all-round experience in clinical pathology, and the possession of a higher qualification in pathology will be considered an advantage.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be returned not later than 31st May, 1958.

VINCENT COLLINGE, Secretary to the Board.

LEEDS REGIONAL HOSPITAL BOARD.

CONSULTANT in Ophthalmology—Leeds and Otley (7 notional half-days per week). Duties at hospitals in the Leeds A Group, outpatient facilities at the Leeds Public Dispensary and Hospital and inpatients at St. James's Hospital, Leeds. Duties include 1 session per week at Otley General Hospital, and consultative work in connection with the School Eye Service. Relief duties as required at hospitals in the Harrogate and Ripon Group. The person appointed to reside in Leeds.

Whole-time ASSISTANT GERIATRICIAN (Senior Hospital Medical Officer grade)—Bradford. Duties under general direction of Consultant Geriatrician at hospitals in the Bradford A and B Groups (670 geriatric beds, including active admission unit of 80 beds at St. Luke's Hospital). Geriatric service established 5 years ago.

Whole-time ASSISTANT PSYCHIATRISTS (Senior Hospital Medical Officer grade).

Broadgate Hospital, Beverley, and associated Clinic at Beverley, Driffield, and Hull. Married accommodation may be available.

Menston Hospital, near Leeds (2500 Beds), and associated general hospitals. Accommodation for single person only.

Storthes Hall Hospital (2680 Beds), Kirkburton, near Huddersfield, and associated general hospitals. Resident or non-resident. Large modern flat available if required. Accommodation also available for single person.

Candidates for these Senior Hospital Medical Officer posts should normally hold a D.P.M., but applications will also be considered from candidates without previous experience in psychiatry who hold a higher qualification and have had wide experience in general medicine in the Senior Registrar grade and who intend to obtain a D.P.M. and specialise in psychiatry.

Applications (12 copies), stating age, qualifications, and details of present and previous appointments, with dates, and names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, by 10th June, 1958.

LINGFIELD HOSPITAL SCHOOL FOR EPILEPTIC CHILDREN. Applications are invited for the post of DEPUTY MEDICAL SUPERINTENDENT to commence duties in the Autumn. Neurological or paediatric experience desirable. Mainly medical but some administrative duties. Salary according to the scale for Senior Hospital Medical Officers. A house is available at a nominal rent for a married man. Superannuable under F.S.S.N.

Applications, stating age, marital status, full particulars of qualifications and experience and names of 2 referees, to be sent to the Medical Superintendent, Lingfield Hospital School, Lingfield, Surrey.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time, NON-RESIDENT SENIOR CASUALTY OFFICER to the Stockport and Buxton Group of hospitals, mainly at Stockport Infirmary. Special experience required in the treatment of orthopædic cases, fractures and trauma. Appointee will assist Consultant Orthopædic Surgeon and also have special responsibilities in the casualty and traumatic (including fracture) clinics. Higher qualification desirable. Tenure of post 4 years. Salary within range of £1653 15s.–£52 10s.–£2126 5s. p.a., according to experience.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 20th May, 1958.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL, MANCHESTER, 13. SENIOR HOSPITAL MEDICAL OFFICER in Ophthalmology. Full-time, or maximum part-time, non-resident post. Previous experience in specialty essential.

Application form obtainable from F. J. CABLE, Secretary, United Manchester Hospitals, to be returned as soon as possible.

NEWCASTLE REGIONAL HOSPITAL BOARD. ASSISTANT PATHOLOGIST (Senior Hospital Medical Officer), whole-time or maximum part-time, for the North West Durham Group of hospitals. The Group Pathology Laboratory is situated in the main hospital at Shotley Bridge (533 Beds) which is the regional thoracic surgery centre and has radiotherapy and plastic surgery units. Special experience in haematology and/or biochemistry is desirable.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

NORTHERN IRELAND HOSPITALS AUTHORITY invite applications for the post of ASSISTANT ADMINISTRATIVE MEDICAL OFFICER. Applicants must be at least 35 years of age and must have had at least 10 years' experience since registration, including experience in the administration of hospital services. The salary for the post will be at the rate of £1892 p.a. rising by 4 annual increments of £84 and 1 increment of £54 to a maximum of £2282 p.a.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 12 noon on 14th June, 1958.

OXFORD REGIONAL HOSPITAL BOARD. Locum CONSULTANT RADIOTHERAPIST required during August and September at Northampton or Reading.

Apply now, stating age, qualifications, experience, and names of 2 referees, to Secretary, 43, Banbury-road, Oxford.

OXFORD REGIONAL HOSPITAL BOARD. Assistant RADIOTHERAPIST (Senior Hospital Medical Officer grade), whole-time, for the Northampton Area Department of Radiotherapy. Candidate should possess the D.M.R.(T.), and have had experience in radiotherapy. The department at Northampton General Hospital may be visited by arrangement with the Medical Director.

Applications (10 copies), stating age, qualifications, experience, and naming 3 referees, to reach the Secretary, Oxford Regional Hospital Board, by 6th June.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD invites applications for a post of CONSULTANT PSYCHIATRIST or MEDICAL PSYCHOLOGIST. The Consultant will be based at Inverness and the post is whole-time and non-resident. Under this new appointment specialised services will be given in the general and mental hospitals in the Region and in the development of child psychiatry. A qualification in psychology and experience in clinical psychology, child psychiatry or psychosomatic medicine will be advantages for the duties of the post.

Application forms and further particulars can be obtained from the undersigned, with whom applications should be lodged by 7th June, 1958. A. M. FRASER, M.D.,

Secretary and Administrative Medical Officer.

Office of the Northern Regional Hospital Board,
Reay House, 17, Old Edinburgh-road, Inverness.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments:

ASSISTANT OPHTHALMOLOGIST at the Western Infirmary, Glasgow. The appointment is on the part-time basis of 4 notional half-days per week. Whole-time salary (at age 32 and over) on the scale £1653 15s.–£52 10s.–£2126 5s.

Whole-time ASSISTANT ANÆSTHETIST at the Western Infirmary, Glasgow. Salary (at age 32 and over) on the scale £1653 15s.–£52 10s.–£2126 5s.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SHEFFIELD REGIONAL HOSPITAL BOARD. Maximum Part-time CONSULTANT ORTHOPÆDIC SURGEON required for the Rotherham and Mexborough Group of hospitals.

Application form and further details from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 7th June, 1958.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires a CONSULTANT SURGEON (1 half-day per week) for the Petersfield Hospital in the Portsmouth Group of hospitals. Candidates should be in possession of higher qualifications. Canvassing will disqualify, but applicants may visit the Hospital by arrangement with Mr. E. H. Hurst, F.H.A., Group Secretary, Portsmouth Hospital Management Committee, St. Mary's Hospital, Milton-road, Portsmouth.

Applications (7 copies), stating age, qualifications and experience, and giving the names and addresses of 3 referees, to the Area Secretary, Highcroft, Romsey-road, Winchester, by 26th May, 1958.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Part-time CONSULTANT E.N.T. SURGEON (3 half-days per week) for the Croydon (Surrey) Group. Duties mainly at Croydon General Hospital.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 7th June, 1958. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time CONSULTANT PSYCHIATRIST at Park Prewett Hospital (1520 Beds), Basingstoke, Hants. Candidates should possess D.P.M., and preferably a higher medical qualification, and have extensive psychiatric experience. Duties will include outpatient clinics in general hospitals and domiciliary visits. Residential accommodation available for single person.

Applications by letter (5 copies), stating date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, London, W.1, by 7th June, 1958. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at West Park Hospital, Epsom. Candidates should have D.P.M.; all modern treatments are carried out and, apart from special skill in psychiatry, a good background of general medicine and surgery is desirable.

Applications (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 7th June, 1958. Applicants may visit Hospital by local arrangement.

DUBLIN. DR. STEEVENS' HOSPITAL. Applications are invited for the position of PATHOLOGIST to the above Hospital. The successful applicant to be responsible for administration of the Pathological Laboratory. The position is a part-time one and involves attending the Hospital in the mornings for a period equivalent to 4 3-hour sessions per week. Salary, which will be in accordance with the Health Act regulations, would be a minimum of £800 p.a. Private practice allowed. Travelling expenses will be paid to applicants from the United Kingdom if they are called for interview. Further particulars may be obtained from the Hospital Secretary. No canvassing, but the Hospital may be visited.

Applications, stating age, nationality, qualifications and details of experience, with the names of 2 referees, should be forwarded to the Secretary to the Board of Governors before 31st May, 1958.

WEST CORNWALL CLINICAL AREA. South Western REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time appointment of CONSULTANT PATHOLOGIST with a special interest in biochemistry and hæmatology in the West Cornwall Clinical Area which comprises the districts of Truro, Bodmin, Newquay, St. Austell, Falmouth, Redruth and Penzance. The successful candidate will work mainly at the Royal Cornwall Infirmary, Truro, but will also be required to visit other hospitals in the clinical area as determined by the Regional Board. The successful candidate, if considered to possess suitable qualifications and experience, may be appointed as Area Pathologist who will be required to co-ordinate the Pathological Services in the West Cornwall Clinical Area.

Applications (12 copies), stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 31st May, 1958.

WESTERN AUSTRALIA. ROYAL PERTH HOSPITAL. Applications are invited for the full-time post of DIAGNOSTIC RADIOLOGIST. Candidates must be fully qualified Radiologists and preference will be given to those with higher qualifications. The status of the post approximates to that of a full-time Consultant in the National Health Service in Great Britain. Salary £A3100 p.a. The Royal Perth Hospital (650 Beds) is the principal teaching hospital affiliated with the recently established Medical School in the University of Western Australia. A memorandum of further particulars concerning this post will be supplied on request to the undersigned, or to the Agent-General for Western Australia, Savoy House, London, W.C.2. DR. M. G. F. DONNAN, Radiologist, of Perth, is now visiting Britain—April and May—and may be contacted c/o the Agent-General. The selected applicant will be required to furnish a satisfactory medical certificate and clear chest X-ray.

In addition to all relevant personal details, applications must include particulars of qualifications, experience, the names of 2 referees, and should reach the Agent-General for Western Australia, Savoy House, 115–116, Strand, London, W.C.2, as early as possible but not later than 31st July, 1958.

JOSEPH GRIFFITH, Administrator.

Hospital Services: Junior Appointments

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.11. HOUSE SURGEON, resident. Vacant 1st June, 1958. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 14th May, 1958.

COLINDALE HOSPITAL, Colindale-avenue, London, N.W.9. (300 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time SURGICAL REGISTRAR, resident or non-resident, required at above Hospital. F.R.C.S. and previous experience an advantage. Post vacant 1st July, 1958. Work covers surgical treatment of pulmonary, orthopædic, urinary, and tuberculous and non-tuberculous chest diseases. The Hospital is situated within easy reach of central London and may be visited by arrangement with Physician-Superintendent.

Application forms obtainable from and returnable to Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, by 24th May, 1958.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (123 Beds.) Applications are invited for the post of SECOND CASUALTY OFFICER with duties in the Department of Orthopædic and Traumatic Surgery (Senior House Officer grade). Recognised for F.R.C.S. Vacant 11th June, 1958. Salary £819 p.a. less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (123 Beds.) HOUSE SURGEON required for 6 months. Post vacant 12th May, 1958. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

FULHAM MATERNITY HOSPITAL, 5/7, Parsons-green, S.W.6. SENIOR HOUSE OFFICER (resident) required, 24th May, 1958. Candidates may visit the Hospital by arrangement.

Applications to be submitted on forms obtainable from Hospital Secretary (L173), Fulham Hospital, St. Dunstan's-road, Hammersmith, W.6, immediately.

GUY'S HOSPITAL AND SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill the following established vacancies for SENIOR REGISTRARS to the Board of Governors of Guy's Hospital and the South East Metropolitan Regional Hospital Board. They will be expected to spend a minimum of 1 and not more than 2 years in a Regional Board Hospital, in the Group as stated, on an exchange basis during a 4-year tenure of the post. The appointments will be made jointly by the bodies concerned and will be held in the first instance at Guy's Hospital. The posts, which will be reviewed annually, are subject to the terms and conditions of service of hospital medical and dental staff (England and Wales) with duties commencing on 1st October, 1958.

General medicine. Bromley Group.
General surgery. South-East Kent Group.
General surgery. Bermondsey and Southwark Group.
Obstetrics and gynæcology. Bromley Group.
Psychological medicine. Bexley Group.
Orthopædic and traumatic surgery. Medway and Gravesend Group.
Clinical pathology. Lewisham Group.
Physical medicine. Orpington and Sevenoaks and Bromley Groups.

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 26th May, 1958.

DULWICH HOSPITAL, East Dulwich-grove, S.E.22. HOUSE OFFICER (general surgical duties) required. Recognised pre-registration post. The Hospital is associated with King's College Hospital Medical School for teaching purposes. Vacant about 1st June.

Apply, with details of age, qualifications, &c., and copy testimonials, or names of 2 referees, to Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, by 19th May.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1 (ROYAL FREE HOSPITAL GROUP). Applications are invited from pre-registration and registered Women medical practitioners for the post of FIRST HOUSE PHYSICIAN for medicine and paediatrics, to become vacant 1st July, 1958. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to The Secretary, Elizabeth Garrett Anderson Hospital, by 21st May, 1958.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1 (ROYAL FREE HOSPITAL GROUP). Applications are invited from pre-registration and registered Women medical practitioners for the post of SECOND HOUSE PHYSICIAN. Appointment for 6 months from 1st July, 1958. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to The Secretary, Elizabeth Garrett Anderson Hospital, by 21st May, 1958.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1 (ROYAL FREE HOSPITAL GROUP). Applications are invited from pre-registration and registered Women medical practitioners for the post of FIRST HOUSE SURGEON, with charge of general surgical beds. Appointment for 6 months from 1st July, 1958. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to The Secretary, Elizabeth Garrett Anderson Hospital, by 21st May, 1958.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1 (ROYAL FREE HOSPITAL GROUP). Applications are invited from pre-registration and registered Women medical practitioners for the post of OBSTETRIC HOUSE SURGEON (recognised for the M.R.C.O.G.). Duties to commence 1st July, 1958. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, to be sent to The Secretary, Elizabeth Garrett Anderson Hospital, by 21st May, 1958.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of SECOND HOUSE SURGEON. Appointment for 6 months, from 1st July, 1958. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 21st May, 1958.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Required to commence at the end of June, 1958, Full-time SURGICAL REGISTRAR (Male). The possession of the Diploma of Fellow of one of the Royal Colleges is desirable. Honorarium at the rate of £850 p.a. Appointment will be for a period of 12 months.

Further particulars may be obtained from the Secretary, to whom applications with the names of 3 referees, should be sent on or before Tuesday, 27th May.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Applications are invited from pre-registration or registered medical practitioners (Male) for the appointment of HOUSE SURGEON to the Midwifery and Gynæcological Departments, to become vacant on 2nd June. Appointment will be for a period of 6 months. National Health Service salary.

Applications to reach the Secretary on or before 20th May, 1958, together with copies of 3 recent testimonials.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Applications invited for the following posts:—

Whole-time NON-RESIDENT SENIOR REGISTRAR (general medicine).

2 whole-time NON-RESIDENT SENIOR HOUSE OFFICERS (1 general medicine, the other general medicine with neurological interests).

Posts vacant in June.

Detailed applications, names 2 referees, to Secretary, Board of Governors, Hammersmith Hospital, Ducane-road, London, W.12, by 21st May.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT REGISTRAR (anæsthetics) required as soon as possible.

Detailed applications, names 2 referees, to Secretary, Board of Governors, Hammersmith Hospital, Ducane-road, W.12, by 19th May.

HAMMERSMITH HOSPITAL AND INSTITUTE OF OBSTETRICS AND CHILD HEALTH, Ducane-road, London, W.12. RESIDENT PÆDIATRIC REGISTRAR required. Post vacant 1st June. Duties involve care of newborn babies in Maternity Department and Premature Baby Unit.

Detailed applications, names of 2 referees, to Secretary, Board of Governors, Hammersmith Hospital, Ducane-road, London, W.12, by 19th May.

HAMMERSMITH HOSPITAL AND INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY, Ducane-road, London, W.12. Locum HOUSE SURGEON (gynæcology) required for approximately 4 months commencing immediately.

Detailed applications, names 2 referees, to Secretary, Board of Governors, Hammersmith Hospital, Ducane-road, London, W.12, immediately.

HAMMERSMITH HOSPITAL AND INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY, AND NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Joint appointment. Whole-time REGISTRAR in Obstetrics and Gynæcology required 1st July, 1958. Appointment tenable for minimum period of 2 years, of which the first year will be spent at the Luton Maternity Hospital and Luton and Dunstable Hospital, Luton (resident), and the second year at the Hammersmith Hospital and Institute of Obstetrics and Gynæcology (non-resident).

Application forms obtainable from and returnable to the Group Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds.

KING'S COLLEGE HOSPITAL BOARD OF GOVER-NORS AND THE SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in Physical Medicine to be made jointly by the bodies concerned, the post to be held at King's College Hospital and in the Lewisham, and Sidcup and Swanley Hospital Groups. Applicants should hold a higher qualification in general medicine and the Diploma in Physical Medicine. The appointment, which will commence on 1st October, 1958, is renewable annually.

Applications, stating age, education, qualifications and experience, and giving the names of 2 referees, should be sent to the undersigned not later than 24th May, 1958.

S. W. BARNES, House Governor.

King's College Hospital, Denmark Hill, S.E.5.

KING'S COLLEGE HOSPITAL BOARD OF GOVER-NORS AND SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in General Surgery, to be made jointly by the bodies concerned, the posts to be held at King's College Hospital and the Brighton Hospital Group. Applicants should hold the qualification of F.R.C.S. The appointment, which is subject to the terms and conditions of service of medical and dental staff, will be on an exchange basis with a 4-year tenure and will commence 1st October, 1958. The successful candidate will spend the first year at King's College Hospital, the second and third years with the Brighton Hospital Group, and the final year at King's College Hospital.

Applications, stating age, education, qualifications and experience, and giving the names of 2 referees, should be sent to the House Governor, King's College Hospital, Denmark Hill, S.E.5, not later than 24th May, 1958.

KING'S COLLEGE HOSPITAL BOARD OF GOVER-NORS AND SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in General Medicine to be made jointly by the bodies concerned, the post to be held at King's College Hospital and in the Brighton and Lewes Hospital Group. Applicants should hold the qualifications of either M.D. or M.R.C.P. The successful candidate will be expected to spend the third year only in a Regional Board Hospital on an exchange basis during a 4-year tenure of the post. The appointment, which is renewable annually, is subject to the terms and conditions of service of hospital medical and dental staff, and will commence at King's College Hospital on 1st October, 1958.

Applications, quoting age, education, qualifications and experience, and giving the names of 2 referees, should be sent to the House Governor, King's College Hospital, Denmark Hill, S.E.5, not later than 24th May, 1958.

MEMORIAL HOSPITAL, Shooters Hill, S.E.18. Senior HOUSE OFFICER (anæsthetics). The post provides good experience and is recognised for F.F.A. R.C.S. and D.A. 6 months' resident appointment and may then be renewed.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

MIDDLESEX HOSPITAL, W.1. Applications invited from fully registered candidates for the following posts vacant 1st August.

SENIOR RESIDENT ASSISTANT ANÆSTHETIST (graded as Senior House Officer).

JUNIOR RESIDENT ASSISTANT ANÆSTHETIST (graded as House Officer).

Forms of application, obtainable from Deputy Superintendent should be returned, naming 2 referees, by 31st May.

MIDDLESEX HOSPITAL, W.1. Applications invited for post of NON-RESIDENT CASUALTY SURGICAL OFFICER graded as Senior House Officer.

Forms of application, obtainable from Deputy Superintendent, should be returned, naming 2 referees, by 31st May.

MIDDLESEX HOSPITAL, W.1. Applications invited from candidates reading for the D.M.R.D. for the post of SENIOR HOUSE OFFICER in the Department of X-ray Diagnosis vacant 1st October. Preference will be given to candidates with a higher degree.

Forms of application obtainable from the Deputy Superintendent should be returned, naming 2 referees, by 31st May.

NATIONAL HEART HOSPITAL, Westmoreland-street, W.1 (with which is associated The Institute of Cardiology). Applications are invited for the post of ASSISTANT RESIDENT MEDICAL OFFICER (Male). The appointment is for a period of 6 months from 1st July, 1958, but may be renewed for a further period of 6 months. The status and salary are those of a Senior House Officer in accordance with the national terms and conditions of service.

Applications, with copies of 3 recent testimonials, should be sent to me not later than Friday, 16th May, 1958.

ROBERT G. E. WHITNEY, Secretary to the Board.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited for the post of RESIDENT MEDICAL OFFICER, vacant 2nd July, 1958, at Maida Vale Hospital for Nervous Diseases, London, W.9. Registrar grading. Appointment in the first instance for 6 months, renewable. Preference will be given to a candidate holding a higher degree.

Applications, giving the names of 3 referees, to be sent to the Secretary at the Maida Vale Hospital, W.9, not later than 31st May, 1958.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of REGISTRAR (whole-time) to the Lysholm X-ray Department at The National Hospital, Queen-square, London, W.C.1, to commence 1st July, 1958, or as soon as possible thereafter. This post carries the grade of Registrar. Applicants should hold a Diploma in Diagnostic Radiology and have had experience in general radiology. The appointment will be for 6 months in the first instance.

Applications, with names of 3 referees, to be sent to the undersigned not later than 30th May, 1958.

H. EWART MITCHELL, Secretary to the Board of Governors.
The National Hospitals for Nervous Diseases,
Queen-square, London, W.C.1.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

Rush Green Hospital, Romford, Essex

REGISTRAR in General Medicine and Infectious Diseases. Resident.

Tilbury and Riverside General Hospital

MEDICAL REGISTRAR. Resident. Flat available.

St. Andrew's Hospital, Billericay

MEDICAL REGISTRAR. Resident or non-resident.

General Hospital, Rochford, Essex

MEDICAL REGISTRAR. Resident or non-resident. Full residential accommodation for single applicants. Furnished or unfurnished flat available for married applicants.

GERIATRIC REGISTRAR. Resident or non-resident. Full residential accommodation for single applicants; furnished or unfurnished flat available for married applicants. Unit of 120 Beds offering wide range of facilities for investigation, treatment and rehabilitation of acute and chronic sick and participation in development of comprehensive geriatric service in area.

East Ham Memorial Hospital, E.7

SURGICAL REGISTRAR (resident, single accommodation). Recognised for F.R.C.S.

Mile End Hospital, E.1

REGISTRAR in Obstetrics and Gynæcology. Resident—post recognised for M.R.C.O.C. in Gynæcology. (Hospital has 69 obstetric and 31 gynæcology beds).

Appointments subject to review after 1 year.

Application forms from Secretary, 11A, Portland Place, W.1, to be returned by 24th May.

NORTH MIDDLESEX HOSPITAL, London, N.18. Casualty OFFICER (Senior House Officer grade). 6 months' appointment, starting 19th May. Non-resident post; recognised for F.R.C.S. 3 Casualty Officers employed: duties include service with the 3 main surgical units.

Applications, stating age, qualifications, experience, together with copies of recent testimonials and/or names of 2 referees, to Hospital Secretary.

NORTH MIDDLESEX HOSPITAL, London, N.18. Locum REGISTRAR in Obstetrics and Gynæcology required for 2 weeks, 2nd–15th June. Busy department—140 obstetric and 60 gynæcological beds. Resident post.

Applications, with full particulars and copies of testimonials or names of 2 referees, to Hospital Secretary.

NORTH MIDDLESEX HOSPITAL, London, N.18. Locum REGISTRAR in Surgery required from 16th June to 13th July. Candidates should hold higher qualification in surgery and must have had considerable experience in emergency surgery. Further details on request.

Applications, with full particulars and copies of testimonials or names of 2 referees, to Hospital Secretary.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. SENIOR HOUSE SURGEON (Senior House Officer grade) required for 6 months commencing 5th June, 1958. Post recognised for F.R.C.S.

Applications, with the names of 3 referees, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 23rd May, 1958.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE SURGEON (pre-registration) required for 6 months commencing 2nd July, 1958.

Applications, with copies of recent testimonials, to Hospital Secretary by 23rd May, 1958.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE PHYSICIAN (pre-registration) required for 6 months commencing 2nd July, 1958.

Applications, with copies of recent testimonials, to Hospital Secretary by 23rd May, 1958.

PADDINGTON GENERAL HOSPITAL, Harrow-road, W.9. (582 Beds.) ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. (575 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (pathology). Fully resident or resident when on duty. The Laboratory is recognised for the examination for the Diploma of Pathology. Further details obtainable from Director of Laboratory, Paddington General Hospital.

Applications, stating age, qualifications, and experience, together with names of 2 referees, to Secretary, Paddington General Hospital, Harrow-road, W.9, by 21st May, 1958.

PRINCESS BEATRICE HOSPITAL, Earls Court, London, S.W.5. Applications are invited from registered medical practitioners for the post of CASUALTY OFFICER with Anæsthetic duties. Senior House Officer grade, recognised for F.R.C.S. Vacancy 1st July, 1958.

Applications, stating age, qualifications, with 3 testimonials, to House Governor, within 14 days from date of advertisement.

PRINCESS BEATRICE HOSPITAL, Earls Court, S.W.5. Applications are invited from registered medical practitioners for the post of HOUSE PHYSICIAN for 6 months (Senior House Officer grade), resident. Opportunity to serve a further 6 months as Obstetric/Gynæcological House Surgeon in the same grade. Vacancy 21st June, 1958.

Applications, with 3 testimonials, to House Governor, within 14 days from date of advertisement.

PLAISTOW HOSPITAL, Samson-street, London, E.13. Applications are invited for appointment of SENIOR HOUSE OFFICER (resident) to the Chest Unit and Infectious Diseases Unit at the above Hospital for 12 months commencing 16th July, 1958 (if possible appointment to be preceded by 4 weeks Locum). Previous experience in diseases of the chest is desirable. Excellent experience is afforded in the investigation of chest and infectious diseases cases and there are good facilities for postgraduate study for the M.R.C.P. examination.

Applications, with copies of recent testimonials, to M. J. HUNTLEY, Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15, by 14th May, 1958.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT JUNIOR HOUSE SURGEON for casualty (pre-registration, first, or second post) to the above Hospital for a period of 6 months, vacant 27th May, 1958.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned immediately.

REGIONAL NEUROSURGICAL CENTRE. (66 Beds.) BROOK GENERAL HOSPITAL, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER (neurosurgery). Vacant 1st June. Post recognised for F.R.C.S. and D.P.M. and provides excellent opportunity for training in neurology.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ROYAL FREE HOSPITAL, W.C.1. Applications are invited from registered medical practitioners for the following posts:—

(*a*) 6 months HOUSE OFFICER, Infectious Diseases Department, followed by 6 months PÆDIATRIC HOUSE PHYSICIAN.

(*b*) 6 months PÆDIATRIC HOUSE PHYSICIAN, followed by 6 months HOUSE OFFICER, Infectious Diseases Department.

The posts are full-time and resident. Duties to commence on 1st July, 1958. Salary and conditions of service in accordance with those laid down by the Ministry of Health.

Application forms may be obtained from the Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 15th May, 1958.

ROYAL FREE HOSPITAL. Applications are invited for the post of SURGICAL REGISTRAR at the Royal Free Hospital. Duties to commence on 1st July, 1958. Appointment for 1 year in the first instance. Candidates should be registered medical practitioners of not more than 10 years' standing and Fellows of the Royal College of Surgeons.

Formal application, giving details of experience, &c., together with the names of 3 referees, should be sent to the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, W.C.1, not later than 21st May, 1958.

ROYAL MARSDEN HOSPITAL, Fulham-road, London, S.W.3. Applications are invited from registered medical practitioners for the post of HOUSE SURGEON (resident). Salary £577 10s. p.a. Post is tenable for 6 months from mid-June.

Forms of application are obtainable from the House Governor, to whom applications, together with copies of 3 recent testimonials, should be sent before 27th May.

ROYAL MASONIC HOSPITAL, Ravenscourt Park, London, W.6. Applications are invited for the post of RESIDENT SURGICAL REGISTRAR, appointment about 1st July, 1958. Gross salary: first year, £935 (residential emoluments of £130 deductible); second year, £1061 10s. (residential emoluments of £145 deductible).

Please state age, qualifications, past and present appointments, and include 2 recent testimonials and/or the names of 2 referees. Applications should reach the undersigned (from whom further information may be obtained) as soon as possible, and in any event not later than 19th May, 1958.

R. E. LAWSON, Secretary and House Governor.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1, and Brockley Hill, STANMORE, MIDDLESEX. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (3 vacancies) for period of 6 months, 1 to commence duties at Great Portland-street on 19th July, 1958, and 2 to commence duties at the Country Hospital, Stanmore, on 12th July, 1958, and 28th July, 1958.

Applications, stating preference, to be received by 30th May, 1958. Forms of application can be obtained from the House Governor at 234, Great Portland-street, W.1.

ROYAL NORTHERN HOSPITAL, Holloway, N.7. Applications are invited for the post of HOUSE SURGEON, vacant 16th June, 1958. Preference given to pre-registration candidates. Recognised for F.R.C.S.

Applications, with copies of testimonials, to be sent to the Hospital Secretary by 20th May, 1958.

ROYAL NORTHERN HOSPITAL, Holloway, N.7. Second RESIDENT ANÆSTHETIST (Senior Hospital Officer grade) required 9th June, 1958. Appointment recognised for D.A.

Applications, with copies of recent testimonials, to be sent to the Hospital Secretary by 20th May, 1958.

ST. MARY'S HOSPITAL, Paddington, W.2. Clinical PATHOLOGIST (Senior House Officer) for a period of 8 months (2 months non-resident, 6 months resident) from 1st June, 1958. Preference given to those intending to specialise in pathology.

Applications, giving full details, with names and addresses of 3 referees, should reach the House Governor not later than 19th May, 1958.

ST. MARY'S HOSPITAL, Paddington, W.2. Diagnostic Radiological Department. POSTGRADUATE TRAINEESHIP, graded Senior House Officer, available from 1st October, 1958, for persons taking the D.M.R.D. course in London 1958–1960. Higher qualification advantageous. Appointment for 1 year, renewable for a second year.

Applications, giving full details, with names and addresses of 3 referees, should reach the House Governor not later than 28th May, 1958.

ST. MARY'S HOSPITAL, Paddington, W.2. Resident ANÆSTHETIST (Senior House Officer) for a first period of 6 months from 1st July, 1958.

Applications, giving full details, with names and addresses of 3 referees, should reach the House Governor not later than 28th May, 1958.

ST. GEORGE'S HOSPITAL, S.W.1. Applications are invited for the post of HOUSE SURGEON in the grade of Senior House Officer to the Surgical Unit at St. George's Hospital. Duties of this post will include work with the General Surgical Unit and in Thoracic Surgery. The successful candidate will be required to take up duty on, or as soon as possible after, 17th June, 1958.

Applications, stating age, education, qualifications, experience, together with the names and addresses of 2 referees, should reach the undersigned not later than 24th May, 1958.

P. H. CONSTABLE, House Governor.

ST. JAMES' HOSPITAL, Balham, London, S.W.12. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required. Post vacant 11th July. Recognised for D.A. and F.F.A. R.C.S.

Application forms, obtainable from Group Secretary, Wandsworth Hospital Group, at above address, to be completed and returned by 24th May.

ST. NICHOLAS HOSPITAL, Tewson-road, Plumstead, S.E.18. SENIOR HOUSE OFFICER (anæsthetics). Vacant 1st July. The post provides good experience and is recognised for F.F.A. R.C.S. and D.A. 6 months' resident appointment and may then be renewed.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. House PHYSICIAN (pre-registration), general medicine and some tuberculosis. Resident. Vacancy mid-June, 1958.

Applications, naming 2 referees, to Medical Superintendent within 14 days.

ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. House PHYSICIAN for duty in Rheumatism Unit. Resident. This post offers valuable experience in general medicine and specialised experience in rheumatic and connective tissue diseases and is very suitable for candidates wishing to take membership. Vacancy 6th June, 1958.

Applications, naming 2 referees, to Medical Superintendent within 14 days.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in General Medicine to fill a vacancy in the approved trainee establishment at the Lewisham Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, 11, Portland-place, London, W.1, not later than 24th May, 1958.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, London, S.W.4. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited from registered Female practitioners for the post of Resident Full-time OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR. Vacant on 1st August, 1958. Appointment recognised for the M.R.C.O.G. as combined appointment; normally for 2 years but subject to review at the end of the first year. Canvassing will disqualify but candidates are invited to visit the Hospital if they so desire.

Forms of application (enclosing self-addressed envelope) from the Secretary, Lambeth Group Hospital Management Committee, Renfrew-road, S.E.11, to whom completed applications should be returned not later than 24th May, 1958.

SOUTH WESTERN HOSPITAL, Landor-road, S.W.9. HOUSE PHYSICIAN (registered or pre-registration) required. Combined tuberculosis and acute medicine. Post vacant 16th June, 1958.

Form of application from the Secretary, to be returned by 24th May, 1958.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 6th September, 1958, for an ASSISTANT RESIDENT MEDICAL OFFICER (Senior House Officer) at the country branch hospital, Tadworth, Surrey (101 Beds).

Further particulars and form of application, which must be returned by 9th June, 1958, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be vacancies on 15th October, 1958, for the following Senior House Officers :

2 HOUSE PHYSICIANS.
1 HOUSE SURGEON.

Further particulars and form of application which must be returned not later than 9th June, 1958, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

WANSTEAD HOSPITAL, Hermon Hill, E.11. (191 Beds.) Applications are invited for post of SENIOR HOUSE OFFICER (resident). Salary £819 10s. p.a. less £150 p.a. for board-residence. Post includes care of general surgical and orthopædic cases and duties in Casualty Department. Recognised for F.R.C.S.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, London, N.W.10. RESIDENT HOUSE SURGEON wanted 15th June, plus 14 days locum from 1st June. Pre-registration candidates eligible.

Applications by 21st May to Hospital Secretary.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. (Hospital for Tropical Diseases, N.W.1.) Resident REGISTRAR required for 6 months from 10th July, 1958, renewable.

Applications, with names of 2 referees, to T. F. W. MACKEOWN, Administrator and Secretary, University College Hospital, by 24th May, 1958.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications are invited for the appointment of SURGICAL REGISTRAR for 1 year in the first instance from a date to be arranged. The successful candidate will be required to undertake a period of duty at the National Temperance Hospital, Hampstead-road, N.W.1.

Applications, with names of 2 referees, to T. F. W. MACKEOWN, Administrator and Secretary, University College Hospital, by 23rd May, 1958.

WEST HAM GROUP HOSPITAL MANAGEMENT COMMITTEE, Stratford, E.15. ANÆSTHETISTS (resident), Senior House Officer grade. For 12 months commencing 11th August, 1958. 6 months Queen Mary's Hospital for the East End and 6 months East Ham Memorial Hospital; combined post recognised for D.A. and F.F.A. R.C.S.

Applications, with names of 3 referees, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 16th May, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Applications are invited for the post of HOUSE SURGEON in the Orthopædic Department (post- or pre-registration). This post, which is recognised for the F.R.C.S., is vacant now.

Application forms from the Hospital Secretary, to be returned within 10 days of the appearance of this advertisement.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the following posts at above Hospital :—

Pre-registration HOUSE SURGEON (general surgery). Post vacant 13th July, 1958.

Pre-registration HOUSE SURGEON (2 posts) (general surgery). Both posts vacant 1st July, 1958.

Application forms obtainable from and returnable to the Hospital Secretary by 20th May, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the post of pre-registration HOUSE SURGEON for the Gynæcology and Urology Departments at above Hospital. This post becomes vacant 1st July, 1958.

Application forms obtainable from and returnable to the Hospital Secretary by 20th May, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the post of HOUSE PHYSICIAN (pre- or post-registration) (general medicine) at above Hospital. This post becomes vacant 1st July, 1958.

Application forms obtainable from and returnable to the Hospital Secretary by 20th May, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the following posts at above Hospital:—

Pre-registration HOUSE PHYSICIAN (general medicine). Post vacant 15th June, 1958.

Pre-registration HOUSE PHYSICIAN (general medicine). Post vacant 1st July, 1958.

Application forms obtainable from and returnable to the Hospital Secretary by 20th May, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the post of SENIOR HOUSE OFFICER in the E.N.T. Department at above Hospital. Post vacant 1st July, 1958.

Application forms obtainable from and returnable to the Hospital Secretary by 20th May, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the post of SENIOR HOUSE OFFICER (pathology) at the Area Laboratory at above Hospital. The post is normally a resident one but applications will be considered from persons wishing to be non-resident providing that they will reside near the Hospital and be on call.

Application forms obtainable from the Hospital Secretary to be returned by 20th May, 1958.

ABERYSTWYTH, CARDIGANSHIRE. GENERAL HOSPITAL. MID-WALES HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (surgical) required (resident). Post recognised for F.R.C.S. examination. Vacancy immediate.

Applications, stating age, experience, &c., to the Group Secretary, Mid-Wales Hospital Management Committee, 31, North-parade, Aberystwyth, Cardiganshire.

ASCOT. HEATHERWOOD ORTHOPÆDIC HOSPITAL. Locum SENIOR HOUSE OFFICER (orthopædics) required last 2 weeks in May.

Applications, giving full details and names of 2 referees, to Secretary.

AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDEVILLE HOSPITAL. RESIDENT HOUSE PHYSICIAN required for the Department of General Medicine. Recognised pre-registration post. Applications from registered practitioners and students who expect to qualify by mid-June will be considered. Post vacant mid-June. Interviews about 23rd May.

Applications, with copies of 2 testimonials, to the Administrative Officer by 16th May, 1958.

AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDEVILLE HOSPITAL. HOUSE SURGEON for Gynæcology Department.

Applications from registered practitioners, with 2 testimonials, to the Administrative Officer by 16th May. Interviews 23rd May.

BARRY ACCIDENT AND SURGICAL HOSPITAL. SENIOR HOUSE OFFICER required at above Hospital. Unfurnished house available to rent.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) SENIOR HOUSE OFFICER required, whose duties will be mainly casualty. The post is tenable for 1 year, and will be vacant in early June. Small furnished flat available.

Applications to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BARROW-IN-FURNESS. NORTH LONSDALE HOSPITAL. Applications are invited for the resident post of HOUSE OFFICER (surgical) (approved for pre-registration) at the North Lonsdale Hospital, Barrow-in-Furness. Post available immediately. Recognised for F.R.C.S.

Applications to the Group Secretary, Barrow and Furness Hospital Management Committee, 105, Abbey-road, Barrow-in-Furness.

BECKENHAM HOSPITAL, Kent. (100 Beds.) House PHYSICIAN required at above Hospital, 1st June. Pre-registration post.

Apply, stating age, qualifications and experience, and naming 3 referees, to Administrative Officer.

BECKENHAM HOSPITAL, Kent. (100 Beds.) House SURGEON required at above Hospital 1st June. Recognised for F.R.C.S. Pre-registration post, with continuity for further 6 months in House Physician post, subject to satisfactory service.

Apply, stating age, qualifications and experience, and naming 3 referees, to Administrative Officer.

BEDFORD GENERAL HOSPITAL. (431 Beds.) 2 resident pre-registration HOUSE PHYSICIANS required end May.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (299 Beds.) HOUSE SURGEON (House Officer or Senior House Officer grade, according to experience). Vacant 1st June, 1958. General surgical duties, some orthopædics. Offers good opportunity for general experience in busy acute general hospital. Recognised for F.R.C.S. Approved pre-registration post but fully registered practitioners may apply.

Applications to Group Secretary, Westwood Hospital, Beverley, Yorkshire.

BIRMINGHAM ACCIDENT HOSPITAL AND REHABILITATION CENTRE, Bath-row, BIRMINGHAM, 15. SENIOR HOUSE SURGEON, vacant July. Hospital is the largest traumatic unit in the country treating 50,000 new patients a year including 2000 burns. Ample opportunity for practical experience in all types of surgery. Recognised for casualty training by R.C.S.

Applications, with names of 2 referees, to Administrator.

BIRMINGHAM ACCIDENT HOSPITAL, Bath-row, BIRMINGHAM, 15. (215 Beds and 8 House Surgeons.) HOUSE SURGEON (resident). Hospital largest traumatic unit in the country and treats over 50,000 new patients each year. Recognised for purpose of casualty by R.C.S. (Eng.). Teaching programme by Consultant staff. 6-month appointment, some of which may be spent in 42-bedded Medical Research Council's Burns Unit.

Apply, naming 2 referees, to Administrator.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Stoke-on-Trent Group. Princes-road, Stoke-on-Trent**

REGISTRAR (surgical), whole-time, City General Hospital (845 Beds). No casualty work; recognised for F.R.C.S. Work includes genitourinary, thoracic, and cardiac, in addition to general surgery.

(2) **Coventry No. 20 Group. Coventry and Warwickshire Hospital, Coventry**

REGISTRAR (anæsthetics), Coventry and Warwickshire Hospital, Coventry. Experience specialty essential. Recognised F.F.A. R.C.S. Resident.

Application forms from Group Secretaries, to be returned by 19th May, 1958.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of RESIDENT OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR for duties at the Queen Elizabeth Hospital and the Birmingham and Midland Hospital for Women (Professorial Unit), vacant immediately.

Forms of application with details of appointment may be obtained from, and should be returned not later than 22nd May, 1958, to, the House Governor, Birmingham and Midland Hospitals for Women, Showell Green-lane, Birmingham, 11.

G. A. PHALP, Secretary.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the non-resident post of SENIOR HOUSE OFFICER or REGISTRAR in Pædiatrics—grading according to experience—for duties at the Birmingham Maternity Hospital, Loveday-street, and the Maternity Department of the Queen Elizabeth Hospital. Previous experience, resident, in a children's hospital is essential, and candidates should hold the D.C.H. or higher qualifications. Post vacant 1st August, 1958.

Applications, stating age, nationality, qualifications and previous appointments, should be forwarded to the House Governor, Birmingham and Midland Hospitals for Women, Showell Green-lane, Birmingham, 11, not later than 28th May, 1958.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the appointment of SENIOR E.N.T. REGISTRAR (non-resident) for duties within the United Hospitals. Higher qualification in the specialty necessary. The appointment will be for 1 year in the first instance and subject to annual review. The successful candidate may subsequently be required to spend not more than 2 years in a selected hospital of the Birmingham Regional Hospital Board in accordance with an arrangement for the interchange of Registrars agreed between the 2 Boards.

Forms of application may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned not later than 24th May, 1958.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of MEDICAL REGISTRAR (resident or non-resident) for duties at the General Hospital. M.R.C.P. essential. This post offers exceptional opportunities for clinical experience and research. In the case of married applicants, housing accommodation outside the Hospital may be available. The successful candidate will be expected to take his turn in reception duty which is arranged on a rota system.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of RESIDENT REGISTRAR in Anæsthetics to the United Birmingham Hospitals. The appointment is tenable for 1 year in the first instance. Preference will be given to candidates who have passed Part I, D.A., or Primary F.F.A. R.C.S.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the appointment of NON-RESIDENT SENIOR HOUSE OFFICER (E.N.T. Department) for duties within the United Hospitals, including the Children's Hospital, commencing 7th July, 1958.

Forms of application may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, and should be returned by 24th May, 1958.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE BIRMINGHAM AND MIDLAND HOSPITAL FOR WOMEN, Showell Green-lane, SPARKHILL, BIRMINGHAM, 11. Applications are invited from registered medical practitioners for the posts of RESIDENT GYNÆCOLOGICAL HOUSE SURGEON, vacant 7th July, 1958. (2 vacancies.) The appointments are recognised for the D.Obst.R.C.O.G. and M.R.C.O.G.

Application forms obtainable from the House Governor at the above address, to be returned not later than 2nd June, 1958.

G. A. PHALP, Secretary.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (775 Beds.) Casualty Department, 40,000 attendances per year. SENIOR HOUSE OFFICER, vacant 27th May, 1958, resident or non-resident. Recognised for F.R.C.S. Tenable for 6 or 12 months.

Detailed applications to the Group Secretary.

BIRMINGHAM (near). MARSTON GREEN MATERNITY HOSPITAL, Berwicks-lane, MARSTON GREEN, near BIRMINGHAM. HOUSE SURGEON (obstetrics) required. 1st July, 1958. 121 obstetric and 10 gynæcological beds. Post recognised for Diploma and Obstetric part of Membership of Royal College of Obstetrics and Gynæcology. Premature Baby Unit. Hospital affiliated to Birmingham Medical School for training of students.

Detailed applications, with copies of 3 recent testimonials, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL. HOUSE SURGEON (pre-registration).

Applications, stating age, qualifications and names of referees, to Medical Superintendent.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. (350 Beds.) HOUSE SURGEON required. Recognised pre-registration appointment. Accommodation available for married officer with no children.

Apply, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee, at above address.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Fully registered HOUSE OFFICER (pædiatrics) required. Post recognised for D.C.H. Duties as laid down by Consultant Pædiatrician.

Applications, stating experience and giving names of 2 referees, to the Group Secretary, Hospital Management Committee, Royal Infirmary, Blackburn.

BLACKBURN. ROYAL INFIRMARY. (262 acute beds.) BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (general surgery) required 1st July, 1958, at the above Infirmary. Recognised for F.R.C.S.

Apply to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. RESIDENT ANÆSTHETIST (Senior House Officer grade). Main duties at Bolton Royal Infirmary and Bolton District General Hospital. Vacant 15th May, tenable for 12 months and recognised for the D.A. and F.F.A. R.C.S.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, to Group Secretary, The Royal Infirmary, Bolton.

BOSTON. GENERAL HOSPITAL. (80 Beds.) Sheffield REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (general surgery and E.N.T.) required with relief duties in the Casualty Department. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 19th May, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees

BRADFORD. ST. LUKE'S HOSPITAL. (724 Beds.) HOUSE SURGEON (general surgery/plastic) required. Recognised for F.R.C.S. and pre-registration purposes.

Applications, stating age, qualifications, experience, and nationality, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRADFORD. ST. LUKE'S HOSPITAL. (724 Beds.) House PHYSICIAN (pædiatrics) required. Recognised for pre-registration purposes.

Applications, stating age, qualifications, experience and nationality, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRADFORD ROYAL INFIRMARY, Bradford, Yorkshire. (507 Beds.) SENIOR HOUSE OFFICER (general surgery/urology) required. Post recognised for F.R.C.S.

Applications, stating age, qualifications, experience, and nationality, to the Secretary.

BRADFORD, 1. THE ROYAL EYE AND EAR HOSPITAL. SENIOR HOUSE SURGEON (ophthalmology) required. Post recognised for D.O.M.S. and F.R.C.S.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to the Secretary, Bradford Royal Infirmary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE SURGEON. The appointment which becomes vacant on 31st May, 1958, is recognised for the F.R.C.S. examination and for pre-registration purposes.

Applications to the Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the immediate appointment of SENIOR HOUSE OFFICER (resident or non-resident—orthopædics and casualty combined). The post is recognised for the F.R.C.S. examination and is normally tenable for 12 months. The Unit consists of a Registrar and 2 Senior House Officers with additional medical assistance during summer months.

Applications to the Hospital Secretary.

BRIGHTON GENERAL HOSPITAL. Applications are invited for the appointment of HOUSE PHYSICIAN to the Medical Unit. This is a pre-registration appointment. Salary in accordance with national scales.

Applications, enclosing recent testimonials, and stating age, qualifications, experience, and giving the names of 2 referees, should be sent to the Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton, 7.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) CASUALTY HOUSE SURGEON required mid-June. Duties include work in Orthopædic and Traumatic Unit. Recognised for pre-registration and F.R.C.S.

Applications, stating age, qualifications, &c., and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRISTOL. FRENCHAY HOSPITAL. Senior House OFFICER in General Surgery required for period 14th May–30th June, 1958.

Applications, stating age and experience and naming 2 referees, to the Group Secretary, Frenchay Hospital, Bristol.

BROMLEY HOSPITAL, Kent. Senior House Officer (anæsthetics), qualified minimum 1 year, for duty at Group hospitals, required 1st July. Recognised for D.A. and F.F.A.R.C.S. Resident, or non-resident if local.

Apply, naming 3 referees, to Administrative Officer.

BURTON-ON-TRENT GENERAL HOSPITAL. Junior HOSPITAL MEDICAL OFFICER (anæsthetist) required. Recognised for D.A.

Applications to Group Secretary.

BURTON-ON-TRENT GENERAL HOSPITAL. Locum JUNIOR HOSPITAL MEDICAL OFFICER (Casualty Officer) required. Resident or non-resident.

Apply Group Secretary.

BURTON-ON-TRENT. THE GENERAL HOSPITAL. HOUSE OFFICER (orthopædics) (pre-registration post) required at the above Hospital. Recognised for F.R.C.S.

Applications to Group Secretary as soon as possible.

BURTON-ON-TRENT. THE GENERAL HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER (orthopædics), resident or non-resident, required at the above Hospital. Furnished or unfurnished flat available for married applicant.

Applications to Group Secretary as soon as possible.

BURY ST. EDMUNDS. WEST SUFFOLK GENERAL HOSPITAL. (262 Beds.)

(*a*) HOUSE PHYSICIAN (pædiatric and general medical duties); vacant late May.
(*b*) HOUSE PHYSICIAN (general medical duties); vacant early June.
(*c*) HOUSE SURGEON (general surgical duties), recognised for F.R.C.S. (surgical); vacant late June.
(*d*) HOUSE SURGEON (general surgical and other duties); vacant late May.
(*e*) HOUSE SURGEON (obstetric and gynæcological duties), recognised for D.Obst.R.C.O.G., vacant early July.

All posts recognised for pre-registration purposes. Enquiries for short-term locum tenens welcome.

Applications, with testimonials or names of referees, to Hospital Secretary.

CARDIFF. ROCKWOOD HOSPITAL. Senior House OFFICER (surgical) required at above Hospital.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of SENIOR REGISTRAR in Child Health. Non-resident appointment, to commence 1st July, 1958.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of SENIOR HOUSE OFFICER in General Medicine at the Cardiff Royal Infirmary. Non-resident post, to commence as soon as possible.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CANTERBURY. KENT AND CANTERBURY HOS-PITAL. (277 Beds.) The post of GENERAL SURGICAL AND UROLOGICAL HOUSE SURGEON (pre-registration or third post), which is recognised for the F.R.C.S., is now vacant. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOS-PITAL. (277 Beds.) The post of SENIOR HOUSE PHYSICIAN is now vacant at Stodmarsh Road Annexe. Duties include care of 30-Bedded unit of chest diseases, also work at the Chest Clinic and with the Pneumoconiosis Unit. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN. (A general children's hospital of 550 Beds.) RESIDENT MEDICAL REGISTRAR required to a firm comprising 180 Beds, including acute medical (60 Beds), poliomyelitis, rheumatism, and long-stay wards.

Applications, on forms obtainable from the Group Secretary, should be returned immediately.

CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN. (A general children's hospital of 550 Beds.) SURGICAL AND ORTHOPÆDIC REGISTRAR required for duties which include shared Registrar responsibility for 120 orthopædic beds and 60 acute and general beds. Applicants are invited to visit the Hospital by appointment with the Physician-Superintendent.

Applications, which should be made on forms obtainable from the Group Secretary, should be returned immediately.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. 2 HOUSE SURGEONS (posts approved for pre-registration service).

(*a*) General Surgery with duties in E.N.T. Vacant early May.
(*b*) General Surgery only. Vacant mid-June.

Applications, stating for which post and giving age, qualifications, &c., with copies of recent testimonials or the names and addresses of 2 referees, to the Secretary at above address.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. SENIOR RADIOLOGICAL REGISTRAR. Post vacant 5th August. Candidates may visit Hospital by arrangement with the Director of Radiology (Telephone: Fairlands 4343, extension 124).

Forms of application, to be returned by 24th May, obtainable from the Group Secretary at above address.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. HOUSE PHYSICIAN (approved for pre-registration service) Vacant 12th June.

Applications, giving age, qualifications, &c., with copies of recent testimonials or the names and addresses of 2 referees, should be sent to the Secretary at above address.

CHEADLE ROYAL—Registered mental hospital. Applications are invited for the appointment of a SENIOR REGISTRAR. Candidates must hold a D.P.M. Excellent facilities for research. Accommodation available if required. Salary as per National Health Service scale. The Hospital operates outside the National Health Service, but reciprocity has been granted between the National Health Service superannuation scheme so that years of service are transferable in either direction.

Applications, giving full details and names of 3 referees, should be sent to the Medical Superintendent, Cheadle Royal Hospital, Cheadle, Cheshire.

CHEADLE ROYAL—Registered mental hospital. Applications are invited for the appointment of a REGISTRAR. Opportunities will be afforded for attendance at courses for the D.P.M. examination at Manchester University. Salary as per National Health Service scale. The Hospital operates outside the National Health Service, but reciprocity has been granted between the National Health Service superannuation scheme so that years of service are transferable in either direction.

Applications, giving full details and names of 3 referees, should be sent to the Medical Superintendent, Cheadle Royal Hospital, Cheadle, Cheshire.

CHELTENHAM GENERAL HOSPITAL. (220 Beds.) HOUSE SURGEON required (pre- or post-registration). The post offers a wide experience in general surgery, gynæcology, and orthopædic surgery. Post recognised for the F.R.C.S.

Apply, with names of 2 referees, to the Secretary, General Hospital, Cheltenham.

CHELTENHAM GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from Male and Female practitioners for the appointment of SENIOR HOUSE OFFICER ANÆSTHETIST which will be vacant in September, 1958. Salary and conditions of service in accordance with Whitley Council regulations.

Applications, with names of referees and full details, to S. T. DAVIS, Group Secretary, General Hospital, Cheltenham.

CHELMSFORD. ST. JOHN'S HOSPITAL. House SURGEON (pre-registration, first or second post). To commence 1st June, 1958. The Hospital deals with a large number of routine and emergency cases. Recognised for training for the Fellowship of the Royal College of Surgeons.

Applications, stating age, nationality, qualifications and experience, together with copies of recent testimonials, should be received not later than 20th May by the Secretary, Hospital Management Committee, Chelmsford Group, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. House PHYSICIAN (pre-registration, first, second or third appointment), Male or Female. To commence 1st June, 1958.

Applications, stating age, nationality, qualifications and experience, together with copies of recent testimonials, should be received not later than 20th May by the Secretary, Hospital Management Committee, Chelmsford Group, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. Resident SURGICAL OFFICER (Senior House Officer grade). Duties to commence 7th June, 1958. The appointment is recognised for training for the Fellowship of the Royal College of Surgeons.

Applications, stating age, nationality, qualifications and experience, together with copies of recent testimonials, to be received not later than 27th May, by the Secretary, Hospital Management Committee, Chelmsford Group, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botleys Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON (Senior House Officer or House Officer (intern) grade). 100 orthopædic beds. Post recognised for F.R.C.S. and pre-registration service. Salary in accordance with terms and conditions of National Health Service. Post vacant 28th May, 1958.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peters' Hospital, Chertsey, Surrey.

CHICHESTER. ROYAL WEST SUSSEX HOSPITAL. CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. RESIDENT MEDICAL REGISTRAR required 1st August for duty primarily at this Hospital (202 Beds) with care, under Consultant Physicians, of 60 adult medical, and 10 children's beds; also assisting Dermatologist. Whitley Council terms and National Health Service superannuation. Salary £935 first year, £1061 10s. second year, less £170 for residence. Candidates may visit Hospital.

Forms from Group Secretary, 174, Broyle-road, Chichester, to be submitted within 14 days.

CHICHESTER. ROYAL WEST SUSSEX HOSPITAL. (202 acute beds.) RESIDENT HOUSE SURGEON required for 6 months' appointment. National salary scales for either provisionally or fully registered practitioners. Post approved for pre-registration practitioners and F.R.C.S. 8 residents. Vacant now.

Applications, stating age, experience, qualifications with references or names of referees, to Senior Administrative Officer.

CHICHESTER. ST. RICHARD'S HOSPITAL. Chichester GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. RESIDENT SURGICAL REGISTRAR required 1st August for duty primarily at this hospital (400 Beds), for 1 year in first instance. Hospital recognised for F.R.C.S. Whitley Council terms and National Health Service superannuation. Salary £935 first year, £106 10s. second year, less £170 for residence.

Forms from, and returnable within 14 days to, Group Secretary, 174, Broyle-road, Chichester.

CREWE AND DISTRICT MEMORIAL HOSPITAL. (140 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (surgical), which is recognised by the Royal College of Surgeons for the F.R.C.S. examination. Now vacant. This Hospital has recently had a new twin theatre suite, and a new large Casualty Department added. There are 7 residents, and ample opportunity for gaining experience in operative surgery will be afforded to the right candidate. Salary and conditions in accordance with Whitley Council scale.

Applications, stating age, qualifications, &c., with names of 2 referees, to be sent to the Group Secretary, Barony Hospital, Nantwich, Cheshire, within 10 days after publication.

CUCKFIELD HOSPITAL, Cuckfield, near Haywards HEATH. MID-SUSSEX HOSPITAL MANAGEMENT COMMITTEE. RESIDENT JUNIOR HOUSE SURGEON (general surgery). Pre-registration post now vacant. Tenable 6 months. Health Service conditions.

Applications, stating age, nationality and experience, with names of 2 referees, to Hospital Secretary.

CUCKFIELD HOSPITAL, Cuckfield, near Haywards HEATH. MID-SUSSEX HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SENIOR HOUSE OFFICER (Orthopædic and Traumatic Unit). Post vacant 1st August. Tenable 6 months in first instance.

Apply, stating age, qualifications, nationality and experience, with names of 2 referees, to Hospital Secretary.

CUCKFIELD HOSPITAL, Cuckfield, near Haywards HEATH. MID-SUSSEX HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOUSE SURGEON (Orthopædic and Traumatic Unit). Post vacant end of May. Not pre-registration.

Applications, giving age, nationality, qualifications and experience, with names of 2 referees, to Hospital Secretary.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for:—

Black Notley Hospital, Braintree, Essex (522 Beds)

Post of HOUSE OFFICER (orthopædic surgery). Duties include care of cases from London Hospital Orthopædic Department. Pre-registration or third post, tenable for 6 months. Recognised for F.R.C.S.

Post of Locum Tenens SENIOR HOUSE OFFICER. Required for period 12th May–6th July, 1958, for Pulmonary Tuberculosis Unit. Also chest clinic work and non-tuberculous diseases of the lungs.

Clacton and District Hospital, Clacton-on-Sea, Essex (58 Beds)

Post of REGISTRAR (temporary) as Resident Casualty Officer during summer for period not exceeding 6 months.

Essex County Hospital, Colchester, Essex (181 Beds)

Post of HOUSE OFFICER to E.N.T. and Pædiatric Departments. Post tenable for 6 months. Post-registration appointment. Recognised for D.L.O. The Pædiatric Department consists of a new unit of 24 Beds.

Post of Locum SENIOR HOUSE OFFICER (anæsthetics) required from 20th May for approximately 2 months.

Post of Locum SENIOR HOUSE OFFICER to Casualty and E.N.T. Departments. Required immediately for 2 or 3 weeks.

Applications, with copies of 3 testimonials to Group Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

COLCHESTER, ESSEX. SEVERALLS HOSPITAL. SENIOR HOUSE OFFICER required at the above Mental Hospital. There are excellent opportunities for up-to-date experience and postgraduate work in all branches of psychiatry, including treatment of neurosis. Opportunities will be given at the Hospital for clinical instruction for the D.P.M.

Applications, with particulars and copies of testimonials, or names of referees, to the Medical Superintendent as soon as possible.

DAGENHAM HOSPITAL, Rainham-road South, Dagenham, ESSEX. (Near Dagenham East Underground Station.) There will be a vacancy for a JUNIOR HOSPITAL MEDICAL OFFICER (resident) on 4th June, 1958, at the above Hospital (150 Beds) for pulmonary tuberculosis—all stages. Salary in accordance with the national scale (£852 10s.–£55–£1182 p.a.) less residential charges. Suitable for candidate studying for higher degree. Further particulars from the Physician-Superintendent.

Applications, stating age, qualifications, and previous experience, together with recent testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement. H. F. HARRIS, Group Secretary,

Ilford and Barking Group Hospital Management Committee.

King George Hospital, Ilford.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) SENIOR HOUSE OFFICER (general surgery), resident. Appointment from 1st June for 6 months. Recognised for F.R.C.S.

Applications, stating full details and 2 names for reference, to Secretary.

DONCASTER ROYAL INFIRMARY. (330 Beds.) Applications are invited for the post of HOUSE SURGEON (Intern or Senior House Officer). Post recognised for F.R.C.S.

Applications, with particulars of experience and copies of 2 recent testimonials, to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary.

DRIFFIELD, YORKSHIRE. EAST RIDING GENERAL HOSPITAL. (247 Beds.) JUNIOR HOUSE PHYSICIAN, vacant now. Approved pre-registration post, but fully registered practitioners may apply. Duties to include geriatrics and acute medicine. Good general experience for first house appointment.

Apply Group Secretary, Westwood Hospital, Beverley, Yorkshire.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION.

The Corbett Hospital, Stourbridge (114 Beds)

HOUSE OFFICER (surgical), pre-registration. Post vacant now.

Wordsley Hospital, near Stourbridge (478 Beds)

HOUSE OFFICER (surgical), pre-registration. Post vacant now.

Applications, naming 2 referees, to Group Secretary, Guest Hospital, Dudley, Worcs.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

ANÆSTHETIC REGISTRAR, Ipswich and East Suffolk Hospital, recognised for D.A. and F.F.A. R.C.S. Appointment for 1 year, renewable for second year. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary at Hospital.

MEDICAL REGISTRAR, North Cambridgeshire and Clarkson Hospitals, Wisbech (273 Beds). Post provides experience in general medicine, pædiatrics, and geriatrics, also facilities for study. Single quarters available. Appointment for 1 year, renewable for second year. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary, North Cambridgeshire Hospital, Wisbech.

RADIOLOGICAL REGISTRAR, Ipswich and East Suffolk Hospital (Anglesea-road Wing), Ipswich. The department is the centre for Consultant Radiological Services for the Ipswich Hospital Group. Post recognised for D.M.R.D. Part II examination. Appointment for 1 year, renewable for second year. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

SURGICAL REGISTRAR, West Suffolk General Hospital, Bury St. Edmunds (262 Beds). Duties include work in Orthopædic Department. Recognised for F.R.C.S. Furnished flat available. Appointment for 1 year, renewable for second year. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary at Hospital.

Applications, stating age, experience, and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 26th May, 1958.

EAST GRINSTEAD. THE QUEEN VICTORIA HOSPITAL. (Plastic Surgery and Jaw Injuries Centre.) TUNBRIDGE WELLS GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for resident appointment of SENIOR HOUSE OFFICER in Anæsthetics, vacant 19th May, 1958. Duties in anæsthesia for both general and plastic surgery. Post recognised for examinations of D.A. and F.F.A. R.C.S.

Apply, stating qualifications, experience, age and names of 3 referees, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells, as soon as possible.

EDINBURGH NORTHERN GROUP OF HOSPITALS. HOUSE SURGEON required for Thoracic Unit, Eastern General Hospital.

Applications, giving names of 2 referees, to the Medical Superintendent, Eastern General Hospital, Seafield-street, Edinburgh, 6.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (647 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time, NON-RESIDENT REGISTRAR in General and Genitourinary Surgery required at above Hospital, which may be visited by direct appointment with Medical Administrator.

Application forms obtainable from and returnable to Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, by 24th May, 1958.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (647 Beds.) 2 RESIDENT HOUSE PHYSICIANS for above Hospital. Posts vacant 1st and 14th June, 1958. 6 months' appointments. Recognised for pre-registration purposes.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Administrator of Hospital by 16th May, 1958.

ELLESMERE PORT HOSPITAL. Applications are invited for the appointment of RESIDENT SURGICAL OFFICER (Junior Hospital Medical Officer grade). This is an acute hospital (39 Beds) at which regular Consultant outpatient and operating sessions are held. The accommodation available is suitable for either a single or a married practitioner.

Applications, giving full details of qualifications and experience, should be forwarded to the Group Secretary, Chester and District Hospital Management Committee, 5, King's-buildings, Chester.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT ORTHOPÆDIC HOUSE SURGEON (third post). Vacant immediately. Post also provides opportunity for general surgery. 6 months' appointment. Post recognised for F.R.C.S.

Applications, with the names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, at Chase Farm Hospital.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEON, pre-registration post. Vacant 11th May, 1958. Duties with General Surgical Unit, doing some genito-urinary work. Post recognised by the Royal College of Surgeons. 6-month appointment.

Applications, with the names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, at Chase Farm Hospital.

ENFIELD. WAR MEMORIAL HOSPITAL, Chase Side, ENFIELD, MIDDLESEX. RESIDENT SENIOR HOUSE OFFICER required immediately for general medical and surgical duties in acute general hospital of 61 Beds. 12 months' appointment.

Applications, with names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, Chase Farm Hospital, The Ridgeway, Enfield, Middlesex.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 11th June, pre-registration post recognised for F.R.C.S.

Applications, stating age, qualifications and experience, with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary at above address.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (E.N.T. Department—30 Beds). Vacant 1st June, 1958. The post is recognised for the F.R.C.S. examination.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary immediately.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from pre-registration and registered medical practitioners for the posts of HOUSE SURGEON (general surgery) (2). Vacant on 16th and 18th May, 1958, respectively.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary immediately.

GLASGOW, S.W.1. DAVID ELDER INFIRMARY. (50 gynæcological beds.) JUNIOR HOUSE OFFICER required for 6 months commencing 1st August, 1958. Post recognised as pre-registration appointment. Recognised for M.R.C.O.G. Some experience possible with obstetric flying squad.

Applications, in writing, to Medical Superintendent, Southern General Hospital, Glasgow, S.W.1.

GRIMSBY. SCARTHO ROAD HOSPITAL. Grimsby HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE OFFICER (surgical) required (pre-registration or Senior House Officer grade) for duties in acute surgical unit of 56 Beds, modern theatre and Outpatient Department. Offers excellent experience of all types of general surgery. Married quarters available. Post vacant May, 1958.

Applications, with names of 2 referees, to Hospital Secretary.

GUILDFORD GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Pathology to work in the Group Pathological Laboratory at St. Luke's Hospital and the Laboratory of the Royal Surrey County Hospital. The Group Laboratory is recognised for training for the Diploma in Pathology. Candidates may visit the Laboratories by arrangement.

Application forms from Group Secretary, Guildford Group Hospital Management Committee, St. Luke's Hospital, Guildford, to whom they should be returned by 24th May, 1958.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (233 Beds.) CASUALTY OFFICER (Senior House Officer) required 6th May or 9th June. Post recognised for F.R.C.S. examination. 2 Casualty Officers are employed, sharing the work of department and the orthopædic and traumatic unit, including fracture clinics. Regular instruction is given in traumatic surgery.

Applications, with copies of testimonials, to the Hospital Secretary.

HALIFAX AREA HOSPITALS MANAGEMENT COM-MITTEE. JUNIOR HOSPITAL MEDICAL OFFICER wanted for duties in the wards for chest cases at the Northorram Hall Hospital, Halifax, and the Outpatient Chest Clinic at the Royal Halifax Infirmary. Approximately 20 non-tuberculous chest patients in hospital and 75 tuberculous. Self-contained flat in good residential accommodation at the Hospital. Vacant end of June.

Applications to be forwarded to the Group Secretary at Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. House OFFICER (pre-registration) required for E.N.T. and Eye Departments at the above Infirmary. Post vacant 14th May.

Applications to the Group Secretary, Royal Halifax Infirmary, Halifax.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) HOUSE SURGEON. Pre-registration post for general surgery and urology required at this acute hospital (surgical) on 1st June, 1958.

Applications, with names of 2 referees, to Administrator.

HASTINGS. ST. HELEN'S HOSPITAL. (493 Beds.) HOUSE PHYSICIAN. Pre-registration post vacant 2nd June. Staff of 5.

Applications to Hospital Administrator by 14th May, 1958.

HASTINGS. ST. HELEN'S HOSPITAL. (493 Beds.) HOUSE SURGEON. Pre-registration post, recognised for F.R.C.S. Modern theatre. Staff of 5.

Applications to Hospital Administrator.

HASTINGS. ST. HELEN'S HOSPITAL. (493 Beds.) SENIOR HOUSE OFFICER (geriatrics) required. Resident. Staff of 5.

Applications to the Hospital Administrator.

HENLEY-ON-THAMES, OXFORDSHIRE. PEPPARD CHEST HOSPITAL. (236 Beds.) READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of JUNIOR HOSPITAL MEDICAL OFFICER, vacant 28th April, 1958. The Hospital deals with all types of chest disease in medical and surgical wards. Previous experience in resident hospital appointments is desirable. Single accommodation is available.

Applications, stating age, qualifications and experience, with the names of 2 referees, should be forwarded to the Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

HEREFORD GENERAL HOSPITAL. (154 Beds.) House OFFICER (general surgery) required immediately. Pre-registration post. Hospital recognised by R.C.S. Duties include care of general surgical beds and in addition for 3 months of orthopædic beds and for 3 months of E.N.T. beds.

Applications, with copies of 2 testimonials, to be sent to the Group Secretary, Victoria House, Eign-street, Hereford.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general, first or second post) to commence 1st June, 1958. Pre-registration post; recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HILLINGDON HOSPITAL, Uxbridge, Middlesex. (621 Beds.) REGISTRAR in General and Traumatic Surgery. Candidates may visit Hospital by direct appointment.

Application forms obtainable from and returnable to Group Secretary, Uxbridge Group Hospital Management Committee, The Furze, Pield Heath-road, Uxbridge, Middlesex, by 19th May.

HITCHIN, HERTFORDSHIRE. NORTH HERTS HOS-PITAL. Applications are invited for the post of RESIDENT HOUSE SURGEON, vacant 15th May, 1958. Recognised for the F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Medical Administrator, Lister Hospital, Hitchin.

HITCHIN, HERTFORDSHIRE. LISTER HOSPITAL. RESIDENT HOUSE SURGEON, post now vacant. Recognised as pre-registration post and for F.R.C.S

Applications, stating age, nationality, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Medical Administrator, Lister Hospital.

HOUNSLOW HOSPITAL, Staines-road, Hounslow, MIDDLESEX. (General acute—81 Beds.) Applications are invited for the appointment of RESIDENT HOUSE SURGEON. Recognised pre-registration appointment for 6 months. Vacant 14th May, 1958.

Applications, stating qualifications and age, together with copies of 3 recent testimonials or names for reference, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Heath-ROAD WING), IPSWICH. Pre-registration post of HOUSE SURGEON to General Surgeon now vacant. Recognised for R.C.S. examination.

Detailed applications, with copies of recent testimonials, to Hospital Secretary.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. Senior HOUSE OFFICER. Department of Orthopædics and Traumatic Surgery (58 Beds.). Vacant 1st July. Post tenable for 6–12 months. Recognised for F.R.C.S.

Applications, stating age, qualifications, medical experience and copies of up to 2 testimonials, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 22nd May, 1958.

LEAMINGTON SPA. WARNEFORD GENERAL HOS-PITAL. (211 Beds.) HOUSE PHYSICIAN. Vacancy suitable for fully registered or pre-registration applicant. Post vacant 16th June, 1958.

Applications, with copies of 2 recent testimonials, to be sent to Hospital Secretary.

LINCOLN. COUNTY HOSPITAL. (200 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON, Male or Female. This is an approved pre-registration post, the duties of which are with the general surgeon. If satisfactory this post will be followed by an appointment for a second 6 months as House Physician.

Applications, with copy testimonials, should be forwarded to the Group Secretary as soon as possible.

LINCOLN. COUNTY HOSPITAL. (200 Beds. Recognised training hospital for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 19th May, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LINCOLN. HARMSTON HALL HOSPITAL. (345 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (psychiatry) required immediately for above Mental Deficiency Institution. Facilities for postgraduate study in conjunction with Sheffield University available. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 19th May, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Anæsthetics

(1) Duties in Leeds A and B Groups. Recognised for F.F.A.R.C.S. and D.A. Resident or non-resident.

(2) Huddersfield Group (approximately 225 Beds in the surgical specialties). Non-resident.

Infectious Diseases

Castle Hill Hospital, Cottingham (167 infectious diseases beds). Resident.

General Surgery

Huddersfield Group (100 general surgical beds). Residential accommodation available. Duties mainly at Huddersfield Royal Infirmary. Recognised for F.R.C.S. May include some duties in the Casualty Department.

Ophthalmology

St. James's Hospital, Leeds (31 eye beds—7600 new outpatients annually), and the Public Dispensary, Leeds. Non-resident.

Applications, stating age, qualifications and details of present and previous appointments, with dates, together with the names and addresses of 3 referees, to the Secretary, The Joint Registrars Committee, Park-parade, Harrogate, by 21st May, 1958.

KEIGHLEY AND DISTRICT VICTORIA HOSPITAL, KEIGHLEY, YORKSHIRE. (General—139 Beds.) 2 RESIDENT HOUSE SURGEONS (either sex).

General surgery and E.N.T., vacant 1st July.

General surgery and orthopædics, vacant 10th June.

Both recognised for F.R.C.S. and approved pre-registration appointments, tenable for 6 months in first instance. 4 residents on staff.

Applications, with full particulars as to age, nationality and qualifications, and copies of 2 testimonials, to Group Secretary, Hospital Management Committee, 17, St. John's Hospital, Fell-lane, Keighley.

KETTERING AND DISTRICT GENERAL HOSPITAL, NORTHAMPTONSHIRE. Applications are invited for the post of Locum HOUSE SURGEON (pre-registration), for the month of May. Post recognised for F.R.C.S.

Applications, stating age, experience, and qualifications, together with copies of 3 recent testimonials, to be sent to the Group Secretary at the above address.

KIDDERMINSTER AND DISTRICT GENERAL HOSPITAL, WORCESTERSHIRE. (112 Beds.) Applications are invited for the pre-registration post of HOUSE PHYSICIAN at the above Hospital.

Applications, with the names of 3 referees, to the Hospital Secretary.

KIDDERMINSTER AND DISTRICT GENERAL HOSPITAL, WORCESTERSHIRE. (112 Beds.) Applications are invited for the pre-registration post of HOUSE SURGEON at the above Hospital. Post vacant middle of June.

Applications, with the names of 3 referees, to the Hospital Secretary.

MAIDSTONE. PRESTON HALL CHEST HOSPITAL, BRITISH LEGION VILLAGE, MAIDSTONE, KENT. Applications are invited for the post of SENIOR HOUSE OFFICER at the above Hospital which contains 330 Beds for treatment of pulmonary tuberculosis and other chest diseases, and includes a major thoracic surgical unit. Married accommodation available. Salary £819 10s. p.a., national scale and conditions.

Applications, stating age, qualifications and experience, with names and addresses of 2 referees, to be sent to the Group Secretary by 31st May, 1958.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON, 6 months' appointment. Vacant now. Recognised for F.R.C.S. Salary at the rate of £467 10s.–£577 10s. p.a. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MANCHESTER. CRUMPSALL HOSPITAL. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade). Now vacant. Tenable for 1 year and presents opportunities for gaining experience in all branches of clinical pathology. Previous experience in pathology not essential.

Applications, with full details and names of 2 referees, by 19th May, 1958, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of REGISTRAR in Anæsthetics. The main duties will be with the Stockport and Buxton Hospital Management Committee with some duties in the Macclesfield and District Hospital Management Committee Group. The post is recognised for the D.A. and F.F.A.R.C.S., and would suit a candidate wishing to study for higher qualification.

Applications, stating age, qualifications, and experience, together with the names of 2 referees, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

MANCHESTER REGIONAL HOSPITAL BOARD. Locum ANÆSTHETIC REGISTRAR required for duties mainly in the Stockport and Buxton Group with some duties in the Macclesfield Group of hospitals.

Applications to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of REGISTRAR in Orthopædic Surgery to the Blackpool and Fylde Group of hospitals, with main duties at Victoria Hospital, Blackpool. There are 65 orthopædic beds in the groups and busy outpatient clinics. Ample scope for gaining experience in all aspects of the work of the department. Post recognised for F.R.C.S. examination and vacant from 1st June, 1958. A furnished flat is available in the married quarters situated in a detached property in a select residential area adjacent to the Hospital.

Applications, stating age, qualifications, experience and the names and addresses of 3 referees, should be sent to the Group Secretary, Blackpool and Fylde Hospital Management Committee, Victoria Hospital, Blackpool.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of RESIDENT REGISTRAR in Obstetrics and Gynæcology. The duties will be with the Stockport and Buxton Hospital Management Committee, mainly at Stepping Hill Hospital and Stockport Infirmary, where there are 72 obstetric and 51 gynæcological beds. The post is recognised for M.R.C.O.G. and is vacant 26th May, 1958.

Applications, stating age, experience and qualifications, together with the names of 2 referees, to be addressed to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

MANCHESTER REGIONAL HOSPITAL BOARD. North AND MID-CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR (chest diseases) required to carry out duties arranged by the Consultant Chest Physician at the Altrincham, Northwich, Crewe Clinics, and the Grange Hospital, Weaverham, and such other duties as may arise at any hospital within the North and Mid and South Cheshire Groups.

Applications, together with 2 recent testimonials, should be sent to the Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE, BAGULEY HOSPITAL. (402 Beds.) The Board invite applications for the post of REGISTRAR in Chest Diseases. This Hospital is a large Thoracic Unit, fully equipped for the medical and surgical treatment of tuberculosis and other chest diseases. Attached to the Hospital is a Chest Clinic. The post offers opportunities for wide experience in medical and surgical treatment of patients suffering from tuberculosis and other diseases of the chest, together with chest clinic work. Ample scope for clinical research.

Applications, stating age, qualifications, nationality, experience and the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, within 7 days of appearance of this advertisement.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. The Board invite applications from registered practitioners for the post of RESIDENT SURGICAL OFFICER (Registrar grade) at the Christie Hospital and Holt Radium Institute. The post provides unique experience in the treatment of tumours and good opportunity for study.

Applications, with full details, including the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MANCHESTER. BOOTH HALL CHILDREN'S HOSPITAL, BLACKLEY, MANCHESTER, 9. (380 Beds. Recognised for D.C.H.) RESIDENT SENIOR HOUSE OFFICER (surgical). Duties orthopædic and E.N.T. Post vacant 1st August.

Applications, giving names and addresses of 2 referees, to be sent to Group Secretary, from whom further particulars may be obtained.

MANCHESTER. BOOTH HALL CHILDREN'S HOSPITAL, BLACKLEY, MANCHESTER, 9. (380 Beds. Recognised for D.C.H.) HOUSE OFFICER (medical), pre- or post-registration. Post vacant 1st August.

Applications, with usual particulars and copies of 2 recent testimonials, to Group Secretary.

MANCHESTER. BOOTH HALL CHILDREN'S HOSPITAL, BLACKLEY, MANCHESTER, 9. (380 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER (resident) required for plastic unit and regional burns unit (45 Beds for severe burns and scalds). Post vacant 26th May. £170 deducted for full emoluments.

Applications, giving names and addresses of 2 referees, to be sent to Group Secretary, from whom further particulars may be obtained.

MANCHESTER, 19. THE DUCHESS OF YORK HOSPITAL FOR BABIES. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. There will be a vacancy at the above Hospital, which is associated with the Manchester University for teaching purposes, for a RESIDENT HOUSE OFFICER, Male or Female, post- or second pre-registration, for 6 months commencing 1st September, 1958.

Applications, with copies of 3 testimonials, to be sent immediately to the Administrative Officer at the above address.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. 3 RESIDENT CLINICAL PATHOLOGISTS (Senior House Officer grade) to commence on 1st and 17th August and 1st September, 1958. Whole-time appointments for 12 months. Previous laboratory experience not essential. Duties consist of routine clinical pathology under the Director of the Department of Clinical Pathology.

Application form obtainable from the Secretary, to be returned not later than 24th May, 1958.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. REGISTRAR to the Group Department of Clinical Pathology, to commence early in June, 1958. Whole-time non-resident post, tenable for 12 months, renewable, primarily intended for the training of pathologists. Previous laboratory experience desirable.

Application form obtainable from the Secretary, to be returned not later than 21st May, 1958.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the appointment of REGISTRAR in Obstetrics and Gynæcology, vacant immediately. Salary at national scales. Initially the appointment will be for 1 year, renewable normally for a second year. The successful candidate will act during the first year as Resident Surgical Officer in the gynæcological branch at Whitworth Park, and possibly during the second year as Resident Obstetric Surgeon in the obstetrical branch of the Hospital at Whitworth-street. The duties include some teaching, the supervision of the work of House Officers and Resident Medical Students, and very considerable clinical responsibility. Candidates must, therefore, have had fairly full previous experience in obstetrics and gynæcology. A higher qualification is not essential.

Forms of application may be obtained from the undersigned. The closing date is 20th May, 1958.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER to the Geriatric Department which will become vacant on 1st June, 1958. Resident or non-resident. Duties are primarily in the active medical wards. Excellent experience is available in the unit which has been developed on modern lines and has available full general hospital facilities.

Applications, stating age, qualifications, present post, experience, and the names of 2 referees, to be forwarded to the Group Secretary at the Hospital immediately.

MIDDLESBROUGH. NORTH ORMESBY HOSPITAL. (184 Beds.) SOUTH TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (surgery) for Surgical Team No. 2 at the above Hospital. The post is recognised for pre-registration service under the Medical Act, 1950, and is vacant now.

Applications, stating full details and giving 2 names for reference, should be addressed to the Hospital Secretary as soon as possible.

MID-WORCESTERSHIRE HOSPITAL MANAGEMENT COMMITTEE. General Practitioner CLINICAL ASSISTANT in Pædiatrics to undertake 4 notional half-days per week, at the rate of £735 p.a. Duties mainly at Bromsgrove and Kidderminster General Hospitals.

Details of the appointment may be obtained from the Secretary of the Committee, Birmingham-road, Bromsgrove, to whom applications should be addressed.

NEWARK GENERAL HOSPITAL. Nottingham No. 1 HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (medical) required for above Hospital situated on Great North-road, approximately 20 miles from Nottingham. Post offers good experience. Consultant staff attending Newark Hospital are on 1 or more of the Nottingham Hospitals. Flat available as married quarters. Salary and conditions of service in accordance with Ministry regulations. Duties to commence about 29th April, 1958.

Applications, giving names of 3 referees, should be sent to Group Secretary, Nottingham No. 1 Hospital Management Committee, General Hospital, Nottingham.

NEWCASTLE GENERAL HOSPITAL. Newcastle upon TYNE HOSPITAL MANAGEMENT COMMITTEE. Department of Neurological Surgery. Regional Unit. SENIOR HOUSE OFFICER. Vacant 9th June, 1958. Recognised for F.R.C.S.

Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR SURGEON, whole-time, for Durham Group of hospitals—Dryburn Hospital (309 Beds). Single or married accommodation available. Post recognised for F.R.C.S. examination.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE. WALKER GATE HOSPITAL, Benfield-road, NEWCASTLE, 6. Chest Unit. Applications are invited for the post of SENIOR HOUSE OFFICER at the above Hospital. A 5-roomed house is available in the Hospital grounds for married applicants. The officer will be required to carry out duties assigned to him under the supervision of the Senior Chest Physician. Facilities are available for attending the D.P.H. course at the University of Durham. National Health Service terms and conditions apply.

Applications, with the names and addresses of 2 referees, should be sent to the Hospital Secretary.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of CASUALTY OFFICER (Senior House Officer) recognised by the Royal College of Surgeons. Vacant 1st June.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 22nd May, 1958.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON for General Surgery. Recognised for the final F.R.C.S. in general surgery, and recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 15th May, 1958.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN for General Medicine and Neurology. Vacant 1st June. This post is recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 17th May, 1958.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON, mainly orthopædic and genitourinary surgery. This is a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 15th May, 1958.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN to the Radiotherapy Department. This post is recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 17th May, 1958.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD.

REGISTRAR (obstetrics and gynæcology) for Edgware General Hospital, Edgware, Middlesex. The Unit has 120 Beds. Possession of higher qualification desirable. Furnished married accommodation becoming available, if required.

RESIDENT REGISTRAR (obstetrics and gynæcology) for Edgware General Hospital, Edgware, Middlesex, and Bushey Maternity Hospital. Possession of higher qualification desirable. The successful candidate will be required to be in residence at Bushey Maternity Hospital, Bushey Heath, Herts (4½ miles from Edgware) where married quarters are available, if required.

Both posts vacant 25th May, 1958.

Hospitals may be visited by direct appointment with the Medical Administrator, Edgware General Hospital.

Application forms obtainable from and returnable to Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, by 17th May, 1958.

NORWICH. UNITED NORWICH HOSPITALS. Applica-tions are invited for the appointment of HOUSE SURGEON at the West Norwich Hospital (Male or Female). This is a pre-registration post and recognised for final F.R.C.S. examination requirements. Duties general surgical and including burns and plastic work. Membership of a medical defence society is a condition of appointment.

Applications, giving full details with names of 2 referees, to Group Secretary, Hospital Management Committee, St. Stephen's-road, Norwich, immediately.

NORWICH. UNITED NORWICH HOSPITALS. Applica-tions are invited for the appointment of Locum HOUSE SURGEON at the West Norwich Hospital (Male or Female). This is a pre-registration post and recognised for final F.R.C.S. examination requirements. Duties general surgical and including burns and plastic work. Membership of a medical defence society is a condition of appointment.

Applications, giving full details with names of 2 referees, to Group Secretary, Hospital Management Committee, St. Stephen's-road, Norwich, immediately.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applica-tions are invited for the post of HOUSE SURGEON, vacant 4th May, 1958. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM CITY AND NOTTINGHAM CHILDREN'S HOSPITALS. (82 and 23 orthopædic beds respectively.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT REGISTRAR (orthopædics) required. Duties also include a temporary weekly session at the Nottingham General Hospital (65 orthopædic Beds). Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 19th May, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM GENERAL HOSPITAL. Resident pre-registration HOUSE PHYSICIAN required mid-June, 1958.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to Group Secretary.

NOTTINGHAM. HIGHBURY HOSPITAL, Bulwell, Not-TINGHAM. SENIOR HOUSE OFFICER (medical), resident, required. Duties to commence on 23rd May, 1958. The successful candidate will, in addition to medical duties, have an opportunity of assisting in the obstetric unit. This post will be accepted as a general medical appointment entry to the M.R.C.O.G. examination.

Apply in writing, stating age, qualifications and experience together with copies of testimonials, to the Hospital Secretary.

NOTTINGHAM. HIGHBURY HOSPITAL, Bulwell, NOTTINGHAM. Applications are invited from fully qualified medical practitioners for the post of SENIOR HOUSE OFFICER (obstetrics) in the Obstetrical and Gynæcological Departments, 48 obstetrical beds, 10 gynæcological beds, and a small block for puerperal pyrexia. This Hospital is recognised for training for the D.Obst.R.C.O.G. The appointment is for a period of 1 year commencing 7th July, 1958. Preference will be given to candidates who have experience in obstetrics and gynæcology. Salary and conditions of service will be in accordance with the Ministry's regulations.

Applications, stating age, experience, qualifications and nationality, with copies of 3 recent testimonials, to be sent to the Hospital Secretary.

OXFORD. UNITED OXFORD HOSPITALS. Applica-tions are invited for the post of NON-RESIDENT REGISTRAR in the Department of Anæsthetics, which will fall vacant shortly, for 1 year in the first instance, eligible for an extension for a second year.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 3 weeks from the date of this advertisement.

OXFORD REGIONAL HOSPITAL BOARD. Registrar in Pathology to Stoke Mandeville Hospital. This is a central clinical laboratory serving Stoke Mandeville and the Aylesbury Hospitals and acting as parent to High Wycombe and Amersham laboratories. It is closely connected with research projects being undertaken at Stoke Mandeville Hospital. Appointment for 1 year in the first instance, eligible for extension for a second year. Applicants may visit Stoke Mandeville by arrangement with the Pathologist. Vacant 1st October.

Application forms from the Secretary, Registrars Committee, 43, Banbury-road, Oxford, by 31st May.

PLYMOUTH. MOUNT GOLD ORTHOPÆDIC HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER for the Orthopædic and Fracture Service, centring on Mount Gold Orthopædic and associated hospitals. Post recognised by R.C.S.

Applications, stating age, qualifications with dates, &c., and with copies of 2 recent testimonials, to be forwarded to the Secretary, Mount Gold Hospital, Plymouth, within 14 days of this advertisement appearing.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, FREEDOM FIELDS. Central Casualty Department. RESIDENT SENIOR HOUSE OFFICER in Casualty, vacant immediately. Recognised for the F.R.C.S.

Applications, with names of 3 referees, to be sent to the Group Secretary.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. Vacancies exist in the following departments :—

HOUSE PHYSICIANS, vacancies 3rd and 15th July, 1958. Greenbank Road Hospital.

HOUSE PHYSICIAN, vacant 1st July, 1958. Freedom Fields Hospital.

HOUSE SURGEONS, vacancies 1st, 9th June, and 1st July, 1958. Recognised for the F.R.C.S. Pre-registration posts. Greenbank Road Hospital.

HOUSE SURGEONS, vacancies 2, both on 1st July, 1958. Recognised for the F.R.C.S. Pre-registration posts. Freedom Fields Hospital.

SENIOR HOUSE OFFICER in Anæsthetics, vacant 1st July, 1958. Recognised for the D.A. and F.F.A. R.C.S.

In all cases send names of 3 referees, also stating age, nationality, qualifications and experience, to Group Secretary, 7, Nelson-gardens, Devonport.

PLYMOUTH, SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. Area Pathological Department. Applications invited from duly qualified and registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER in Pathology. The post is recognised for non-university experience for D.Path., Royal College of Physicians and Surgeons. The appointment will be for a period of 12 months, in the Area Laboratory at the South Devon and East Cornwall Hospital, Greenbank-road, Plymouth, which provides excellent modern working facilities.

Applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, to be sent as soon as possible to Group Secretary, 7, Nelson-gardens, Stoke, Plymouth.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (336 Beds and large Outpatient Department—serving population of 174,000.) PONTYPRIDD AND RHONDDA HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (pathology). The post is to 30th September, 1958, in the first instance. Previous experience in pathology not essential. Emergency duties are shared with other residents.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Courthouse-street, Pontypridd, as soon as possible.

PORTH AND DISTRICT HOSPITAL, Porth, Rhondda. (110 Beds—visited regularly by Consultants from Cardiff Royal Infirmary.) PONTYPRIDD AND RHONDDA HOSPITAL MANAGEMENT COMMITTEE.

RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER (surgery). Married quarters available if required.

Locum JUNIOR HOSPITAL MEDICAL OFFICER (surgery) required immediately until permanent appointment is made.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Courthouse-street, Pontypridd.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Royal Portsmouth Hospital (70 surgical beds)

HOUSE SURGEON (pre-registration), vacant now.

St. Mary's Hospital (120 surgical beds)

HOUSE SURGEON (pre-registration), vacant now.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST, St. Mary's Hospital, Milton-road, Portsmouth.

READING AREA DEPARTMENT OF MEDICINE. Applications invited from registered and provisionally registered medical practitioners for 2 RESIDENT HOUSE PHYSICIAN posts, for 6 months from 1st June. Successful candidates required to carry out duties at following Reading Hospitals : Royal Berkshire (397 Beds) and Prospect Park (104 Beds).

Write, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary, Royal Berkshire Hospital, Reading.

READING. BATTLE HOSPITAL. (391 Beds.) Reading AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for 2 posts of RESIDENT JUNIOR HOUSE SURGEON (pre- or post-registration) required in the Accident and Orthopædic Department. F.R.C.S. recognised. Also casualty duties. Vacant 1st and 18th May, 1958.

Apply, stating age, qualifications with dates, nationality, present post, with copy of recent testimonial, to Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (339 Beds.) Applications are invited from registered medical practitioners (Male or Female) for the post of RESIDENT SENIOR HOUSE OFFICER (anæsthetics). Vacant 1st May, 1958, for a period of 1 year. Post recognised for F.F.A. R.C.S.

Write, stating age, qualifications with dates, nationality and present post, together with names of 3 referees, to Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

READING. ROYAL BERKSHIRE HOSPITAL. (397 Beds.) Applications are invited from registered and provisionally registered medical practitioners for 2 RESIDENT HOUSE SURGEON posts (1 immediately, 1 1st June) for 6 months.

Write, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary.

REDHILL COUNTY HOSPITAL, Earlswood Common, REDHILL. HOUSE SURGEON (gynæcology). Resident post vacant 7th July, recognised for pre-registration service and for M.R.C.O.G.

Apply to Group Secretary, Redhill Hospital Management Committee, Earlswood Mount, Pendleton-road, Redhill, Surrey.

REDHILL COUNTY HOSPITAL, Earlswood Common, REDHILL. RESIDENT HOUSE SURGEONS. 2 pre-registration posts vacant 1st July, recognised for F.R.C.S. House Physician posts to follow if required.

Apply, Group Secretary, Redhill Hospital Management Committee, Earlswood Mount, Pendleton-road, Redhill, Surrey.

RETFORD, NOTTINGHAMSHIRE. RAMPTON HOSPITAL. (1143 Beds for defectives of both sexes.) SENIOR REGISTRAR. Psychiatric experience essential; D.P.M. or Part I thereof desirable. Excellent opportunities for study and research into psychopathic disorders. Modern house available (or flat, if single). Candidates may visit Hospital by appointment.

Applications, naming 3 referees, to Medical Superintendent by 23rd May, 1958.

RICHMOND, SURREY. ROYAL HOSPITAL. Pre-registration HOUSE PHYSICIAN required 14th May, 1958, for busy Acute General Hospital of 121 Beds with full Consultant staff.

Applications invited immediately (acceptable in advance of examination results), giving age, qualifications, and names of 2 referees, to Administrative Officer.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (medicine) (Assistant Resident Medical Officer) required immediately at Birch Hill General Hospital. Resident staff includes Registrar (Resident Medical Officer) and 3 House Physicians.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (surgery) required immediately for busy Surgical Unit. Post recognised for F.R.C.S. qualification and offering excellent experience.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT PÆDIATRIC HOUSE PHYSICIAN (Male or Female) required from 4th June, 1958. The Department includes a Premature Baby Unit of 9 cots and 50 children's medical beds.

Applications should be addressed to the Secretary, Romford Group Hospital Management Committee, at the Hospital as soon as possible.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit from 26th May, 1958. The service consists of 100 Beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, as soon as possible.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER (neurosurgery) required from 21st June, 1958. Suitable for candidates seeking higher medical or surgical qualifications. Recognised for the F.R.C.S. (Eng.).

Apply to Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, as soon as possible.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) 2 Locum MEDICAL REGISTRARS required; 1 post vacant now in medicine, and 1 vacant on 1st June in medicine and infectious diseases, probably for 2–3 months. Applications at once to Medical Superintendent.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE SURGEON (Male) required immediately. Not pre-registration appointment.

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

RYDE, I.W. ROYAL I.W. COUNTY HOSPITAL. Senior HOUSE OFFICER required immediately as Assistant Casualty/Orthopædic Officer.

Applications, with names of 2 referees, to Hospital Secretary.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order for a period of 6 months in each post from 1st July. Posts open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Pædiatric House OFFICER required at Odstock Branch. 55 medical and surgical beds. Recognised for D.C.H. Vacant 25th July.

Applications, with names and addresses of 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN for a period of 6 months from 1st July. Post open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON (recognised by R.C.O.G.) for a period of 6 months in each post from 20th July. Posts open to pre-registration candidates.

Apply, giving names and addresses of 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALFORD. LADYWELL HOSPITAL. Salford Hospital MANAGEMENT COMMITTEE. Applications are invited for the post of GENERAL DENTAL OFFICER at the above Hospital for 2 half-days per week. The work involves full dental treatment of long-stay adult patients of all ages. At present there are equal numbers of geriatric and tuberculous patients. Salary and conditions of service in accordance with the National Health Service (remuneration and conditions of service) regulations, at present £157 10s. p.a. per weekly half-day.

Applications, stating age, qualifications and experience, together with the names of 2 referees, to the Hospital Secretary, Ladywell Hospital, Salford, 5, Lancs, as soon as possible.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR at Dingleton Mental Hospital, Melrose. During the tenure of the post opportunities for interchange of duty and training at other centres in the Region may be available under the joint training scheme of the South-Eastern Regional Hospital Board and the Department of Psychological Medicine of the University of Edinburgh. A house is available.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 31st May, 1958.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. (262 Beds.) Vacancy for HOUSE SURGEON late May. Pre-registration or Senior House Officer according to experience. Busy hospital with large surgical turnover.

Applications, naming 2 referees, to Group Secretary, Scunthorpe Hospital Management Committee.

SHEFFIELD, 5. CITY GENERAL HOSPITAL. Locum SENIOR HOUSE OFFICER (orthopædics) required for the period up to 14th July, 1958. Rate of pay £15 19s. per week.

Apply, giving full details, to the Group Secretary, Sheffield No. 1 Hospital Management Committee, "Lyndhurst", Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for 2 posts of RESIDENT SENIOR HOUSE OFFICER in Clinical Pathology at the Royal Infirmary. Posts vacant 15th and 25th July. Pathological experience not essential, but candidates must have previous clinical experience. Successful candidates will work in turn in the different branches of clinical pathology in the laboratories of the United Sheffield Hospitals.

Applications, with the names of 3 referees, should be sent to the Superintendent, Royal Infirmary, Sheffield, 6, immediately.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS AND SHEFFIELD REGIONAL HOSPITAL BOARD. Rheumatic Diseases Research. The Sheffield Centre for the Investigation and Treatment of Rheumatic Diseases is engaged in chemical and clinical research on behalf of the severe rheumatic diseases and a REGISTRAR is required. Work suitable for an M.D. thesis is envisaged. Interest in this line of work more important than previous experience.

Applications, with the names of 3 referees, to the Chief Administrative Officer, United Sheffield Hospitals, West-street, Sheffield, 1, not later than 17th May, 1958.

SHREWSBURY. ROYAL SALOP INFIRMARY. (241 Beds.) SENIOR HOUSE OFFICER (casualty), resident or non-resident. Duties from 9 A.M. to 6 P.M. daily, except Saturday which will be 9 A.M. to 1 P.M. Applicant required to do 1 weekend's duty in 3. Post recognised for F.R.C.S. Vacant 1st June, 1958.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE SURGEON. Vacant immediately. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SKIPTON (near). GRASSINGTON HOSPITAL. (208 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required for the above Hospital, which provides treatment for tuberculous patients, men and women. Accommodation available for single applicants.

Applications to Medical Superintendent.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires a Whole-time Locum Tenens SENIOR REGISTRAR in Pathology for the Salisbury Group of hospitals for 3 months in the first instance from 20th May, 1958. Applicants should have had experience in all branches of pathology, and a special interest in hæmatology would be helpful. Accommodation for a single person is available.

Applications (2 copies), stating age, qualifications and experience and the names and addresses of 3 referees, to the Area Secretary, Highcroft, Romsey-road, Winchester, by 19th May, 1958.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (274 Beds. Recognised for F.R.C.S.) ORTHOPÆDIC HOUSE SURGEON (pre-registration candidates eligible). Post offers excellent experience in the treatment of traumatic conditions.

Applications to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (465 Beds.) RESIDENT HOUSE OFFICER in General Medicine with some Neurological work under the supervision of the Area Neurologist. Pre-registration candidates eligible.

Applications should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. HOUSE SURGEON, 1 of 2, required. Pre-registration post vacant 9th June.

Applications, with names of 2 referees, to Secretary by 22nd May.

SOUTHEND-ON-SEA GENERAL HOSPITAL. Applications are invited for the post of RESIDENT DEPUTY CASUALTY OFFICER (Senior House Officer grade) with duties in the Fracture and Orthopædic Department for a period of 6 months. Post now vacant, and recognised for the F.R.C.S.

Applications, stating age, qualifications and experience, with copies of recent testimonials, to reach the Secretary as soon as possible.

ST. ALBANS, HERTFORDSHIRE. CELL BARNES HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required at above Hospital. This is a modern hospital where 895 mental defectives of all types and ages are under care. Approved for D.P.M. Good pædiatric experience available. Hospital may be visited by direct appointment.

Application forms obtainable from the Group Secretary, Harperbury Hospital, St. Albans, Herts.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE PHYSICIAN (House Officer grade) required for 1 of the 2 medical teams. Post vacant 3rd June, 1958, and tenable for 6 months. Preference given to candidates seeking post under the Medical Act, 1950.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL. (384 Beds.) North West METROPOLITAN REGIONAL HOSPITAL BOARD. CASUALTY OFFICER (Registrar grade) required. Post recognised for F.R.C.S. regulations. Appointment tenable for 6 months from approximately 27th May, 1958, and subject to review at end of this period.

Application forms obtainable from and returnable to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, Hertfordshire.

ST. ASAPH HOSPITAL, St. Asaph, Flintshire. Appointment of HOUSE SURGEON. Duties divided between ophthalmology (16 Beds), E.N.T. (12 Beds), and oral surgery (4 Beds). Post vacant 1st June, 1958.

Applications, stating age, qualifications and experience, accompanied by 2 recent testimonials, to be sent forthwith to the Group Secretary, Clwyd and Deeside Hospital Management Committee, Rhianfa, Russell-road, Rhyl.

STOCKPORT INFIRMARY. (163 Beds.) Applications are invited for the post of HOUSE OFFICER (general surgery), vacant 3rd June, 1958. This is an approved pre-registration post and is recognised for the F.R.C.S.

Applications, with copies of 2 testimonials, to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOCKPORT AND BUXTON HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics) with duties at Stepping Hill Hospital, Stockport (529 Beds), and Stockport Infirmary (163 Beds). The post is recognised for the D.A. and F.F.A. R.C.S., and there are ample opportunities for study.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOCKPORT. STEPPING HILL HOSPITAL. (529 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (pædiatrics). The post, which may be either resident or non-resident, becomes vacant on 1st June, 1958.

Applications, stating age, qualifications and experience, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

SWANSEA HOSPITAL, Swansea. (413 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER in the Traumatic and Orthopædic Department of the above Hospital. The post is recognised under the F.R.C.S. regulations for 6 months' casualty training. It offers exceptional experience in all aspects of traumatic surgery as occurring in a large industrial centre and port.

Applications, stating age and experience, together with copies of 2 recent testimonials, should be forwarded to the Hospital Secretary. T. E. JONES, Group Secretary.

TORQUAY. TORBAY HOSPITAL. (166 acute general beds.) HOUSE OFFICER (medicine), Male or Female, required for mid-June, 1958. Pre-registration appointment. General duties which will include some work in the E.N.T., the Ophthalmic, and Radiotherapy Departments.

Applications, stating qualifications, nationality, age, together with copy testimonials (quoting Ref. F. 955/91), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. Applications invited for post of RESIDENT SENIOR HOUSE OFFICER to Special Unit for Juvenile Rheumatism, vacant 14th May. Post offers scope for those interested in research, pædiatrics, rheumatology or cardiology, and previous experience in one of these is desirable. The post is tenable for 1 year in the first instance.

Applications, stating age, qualifications, experience with dates, and copies of 3 testimonials, to Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required immediately. Pre-registration post.

Applications, stating age, qualifications, with dates, and copies of 2 testimonials, to Secretary.

TAUNTON (near). TONE VALE GROUP HOSPITAL MANAGEMENT COMMITTEE, NORTON FITZWARREN, near TAUNTON, SOMERSET. Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER with duties mainly at Tone Vale Hospital, a modern psychiatric hospital of 1100 Beds, treating all forms of mental and nervous disorder and including a unit for psychotic children. The post provides an excellent opportunity for postgraduate training in psychiatry, including outpatient clinic work, and particularly the study of child psychiatry not only with psychotic children in the unit at the Hospital, but also attendance at child guidance clinics in the county. Every facility is provided for study for the D.P.M., and facilities are also available for research and opportunities for work for the M.D. degree. Previous holders of this post have been granted special study leave. Accommodation at a moderate charge is available for a single person. The appointment will, in the first instance, be limited to 3 years and will be subject to the terms and conditions of service for hospital medical staffs (present salary scale £852 10s.–£1182 10s. p.a.).

Applications, giving details of age, qualifications and experience, together with the names and addresses of 2 referees, should be forwarded to the Group Secretary, within 10 days of the appearance of this advertisement.

WAKEFIELD. STANLEY ROYD HOSPITAL. Applications invited for post of JUNIOR HOSPITAL MEDICAL OFFICER or SENIOR HOUSE OFFICER in Psychiatry. Accommodation available for a single person.

Address written applications, giving full personal particulars, details of training, experience, &c., and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WARRINGTON INFIRMARY. Applications are invited from Males and Females for the post of RESIDENT CASUALTY OFFICER (graded as Junior Hospital Medical Officer) at the above Hospital. The post is recognised for the F.R.C.S. Scale of salary £852 10s.–£55–£1182 10s. less a deduction of £170 for residential emoluments. A whole-time Senior Hospital Medical Officer is in charge of the Department.

Applications, stating age, experience and qualifications, should be forwarded to :—

HENRY L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARWICK (near). KING EDWARD VII MEMORIAL CHEST HOSPITAL. (Diseases of the chest. 228 Beds.) SENIOR HOUSE OFFICER, resident desirable. Hospital is modern with Thoracic Surgery Unit.

Applications to Medical Superintendent.

WATFORD. SHRODELLS HOSPITAL. (General Hospital —320 Beds.) Applications are invited for the post of GYNÆCOLOGICAL HOUSE OFFICER (Junior Hospital Medical Officer grade) required to start middle of June. Post recognised for the M.R.C.O.G.

Applications, together with copies of 2 testimonials, should reach the Medical Administrator as soon as possible.

WELSH REGIONAL HOSPITAL BOARD. Registrar (plastic surgery), St. Lawrence Hospital, Chepstow (182 Beds). Expected to visit other hospitals in South Wales area. Considerable opportunities for training in specialty. Accommodation for single person. Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WEST BROMWICH AND DISTRICT HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from suitably qualified persons for the post of Part-time G.P. CLINICAL ASSISTANT in Dermatology for 2 notional half-days per week to be spent at the District Hospital and Hallam Hospital respectively with other duties at Moxley Hospital as required.

Applications, giving full particulars and the names of 3 referees, to be sent to the Group Secretary at the West Bromwich and District General Hospital, Edward-street, West Bromwich, not later than 16th May, 1958.

WEST HERTS GROUP HOSPITAL MANAGEMENT COMMITTEE. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Locum Tenens MEDICAL REGISTRAR required, whole-time, resident or non-resident, for Geriatric Department. Post vacant 16th May.

Telephone Watford 6633, or write Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford.

WEYMOUTH AND DISTRICT HOSPITAL. House SURGEON (Male or Female) required for resident pre-registration post. Recognised for F.R.C.S. examination and tenable for 6 months.

Applications, stating age, qualifications, together with copy testimonials, to Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (327 Beds.) HOUSE SURGEON to the Senior Surgeon. Post vacant immediately.

Applications, with copies of 2 testimonials, to the Group Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (327 Beds.) HOUSE SURGEON (post recognised by Royal College of Surgeons) required for general surgery with some E.N.T. duties. Approved pre-registration post. Vacant immediately.

Applications, with copies of 2 testimonials, to Group Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (327 Beds.) HOUSE PHYSICIAN (pre-registration). Vacant 8th June.

Applications, with copies of 2 testimonials, to the Group Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Surgery (Registrar grade) required at the above Hospital. Vacant middle of May. The Hospital is recognised for the F.R.C.S. There is also a Senior Surgical Registrar in the Hospital.

Forms of application obtainable from Group Secretary, at the Hospital.

WINDSOR. KING EDWARD VII HOSPITAL. Required Locum RESIDENT MEDICAL REGISTRAR from 9th to 22nd June.

Applications, giving age, nationality, qualifications and experience, with names of 2 referees, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General Surgery required, Male or Female, for post vacant 14th June. Recognised for F.R.C.S. Pre-registration post.

Applications, stating age, nationality, qualifications and copies of recent testimonials, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. Registrar (Casualty Officer), resident, required immediately. There is an Accident Unit of 30 Beds at the Hospital and with the Casualty Department forms part of the Accident Service for the Windsor Group and includes duties with the E.N.T. and Eye Departments. Candidates should have had previous experience in the treatment of acute injuries.

Application forms from and returnable to Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor.

WOKING, SURREY. VICTORIA HOSPITAL. (72 Beds.) SENIOR HOUSE OFFICER (post-registration appointment) required for medical, surgical and casualty duties.

Apply, with 2 testimonials, to Hospital Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An associated hospital of the Birmingham University Medical School.) SENIOR HOUSE OFFICER (anæsthetics). Post vacant 21st May. Recognised for D.A. and F.F.A. R.C.S. Flat available for married applicant.

Apply, with copies of 2 testimonials, to the Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An associated hospital of the Birmingham University Medical School.) ORTHOPÆDIC SENIOR HOUSE SURGEON for Fracture and Orthopædic Department. Post recognised for F.R.C.S. Vacant immediately.

Apply, with 2 testimonials, to the Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. Locum Tenens SENIOR HOUSE OFFICER (general surgery) required immediately for 4 weeks.

Apply to the Secretary. Telephone Wolverhampton 26551.

WORCESTER ROYAL INFIRMARY. (213 Beds.) Senior HOUSE OFFICER (surgical) required at this busy acute Hospital which is the consultative and accident centre of the Group. The post, which is recognised for the F.R.C.S. examinations, is deputy to the Surgical Registrar and involves some orthopædic work.

Applications to Hospital Secretary.

WORKINGTON INFIRMARY, Cumberland. (150 Beds, pre-registration post.) HOUSE OFFICER or SENIOR HOUSE OFFICER for orthopædic, surgical, and casualty duties. Vacant now.

Applications, with dates, and names of 2 referees, to Group Secretary.

WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of ANÆSTHETIC REGISTRAR in the above Group (Southlands Hospital, 411 Beds; Worthing Hospital 210 Beds). Vacant 8th July. Post is recognised for the D.A. and F.F.A. R.C.S.

Forms of application are obtainable from the undersigned and should be returned within 14 days from the appearance of this advertisement. A. V. OAKTON, Group Secretary,

Worthing Group Hospital Management Committee.
129, Brighton-road, Worthing, Sussex.

YORK. COUNTY HOSPITAL. (General hospital of 266 Beds with full Consultant staff.) SENIOR HOUSE OFFICER in Ophthalmology required immediately. Post is recognised for D.O. and F.R.C.S.

Applications, giving age, qualifications, experience, nationality, and names of 2 referees, to Group Secretary, York A and Tadcaster Hospital Management Committee, Bootham Park, York.

YORK MILITARY HOSPITAL (Civilian Wing, 60 Beds). SENIOR HOUSE OFFICER required immediately, resident or non-resident. There are 30 general surgical and 30 medical beds. The Hospital is associated with the County Hospital (general, 266 Beds) where relief casualty and emergency work and relief work for House Surgeons may be undertaken, and where residence can be provided.

Applications, stating age, nationality, experience, qualifications and names of 2 referees, to Group Secretary, York A and Tadcaster Hospital Management Committee, Bootham Park, York.

BELFAST. MUSGRAVE PARK HOSPITAL, Balmoral, BELFAST. HOUSE OFFICERS. 2 vacancies—1 surgical, 1 medical.

Application forms obtainable from Group Superintendent/Secretary, Belfast City Hospital, Lisburn-road, Belfast, to whom completed forms should be returned as soon as possible.

CANADA. ROYAL COLUMBIAN HOSPITAL, New WESTMINSTER, BRITISH COLUMBIA, CANADA. Approved ROTATING INTERNESHIPS available in a general hospital of 434 Beds and 51 Bassinets. Honorarium $200 per month gross.

Address inquiries to Director, Royal Columbian Hospital, New Westminster, British Columbia, Canada.

CANADA. ST. PAUL'S HOSPITAL, Vancouver, British COLUMBIA, CANADA. Applications are invited for 1 year JUNIOR ROTATING INTERNESHIPS at approved large general hospital. Remuneration $175 per month.

Apply Sister Superior, St. Paul's Hospital, 1081 Burrard-street, Vancouver, B.C., Canada. Canadian, American or British graduates only are acceptable.

B.W.I. UNIVERSITY COLLEGE HOSPITAL OF THE WEST INDIES. Applications are invited from registered medical practitioners for the appointment of CASUALTY OFFICER (surgical) which will be vacant 1st July, 1958. The post is generally tenable for 6 months, but a candidate recruited from outside Jamaica and for whom a return passage (by sea or by air) is provided, will be offered a contract for 1 year covering 2 appointments of 6 months each. The salary will be at the rate of £750 p.a. less a deduction of £145 p.a. for single accommodation and board-residence.

Further information may be obtained from the Hospital Manager and Secretary, University College Hospital of the West Indies, Mona P.O., Jamaica, to whom applications, stating age, nationality, qualifications and experience, together with names and addresses of 3 referees, should be sent not later than 31st May, 1958.

NEW YORK. NEW ROCHELLE HOSPITAL, New ROCHELLE, NEW YORK, U.S.A. (383-Bed general community hospital.) Approved by the Joint Commission on Accreditation of Hospitals. Also approved by the American College of Surgeons and American Medical Association for Interneship and Residency training. Only graduates from approved university schools accepted. Interneships available for the 1-year term commencing 1st July, 1958. Stipend is $200 per month plus complete maintenance.

Apply Superintendent.

MICHIGAN, U.S.A. OAKWOOD HOSPITAL, Dearborn, MICHIGAN. Applications are invited for 1 year approved ROTATING INTERNSHIP beginning 1st July, 1958. 234-Bed General Hospital 10 miles from Detroit. Excellent facilities. Hospital approved for exchange-visitor programme. Salary $200 if single, $250 if married. Housing rent-free.

Apply Director.

U.S.A. EMILY P. BISSELL HOSPITAL, Wilmington, DELAWARE, U.S.A. HOUSE PHYSICIAN, position available 1st July, 1958. Modern 215-bed accredited tuberculosis hospital on Atlantic seaboard, 2 hours from New York. Salary, with 1 year experience in tuberculosis, $7200. Junior staff member, $6000. Furnished apartment and utilities.

Address, E. W. HAINLEN, M.D., Medical Director Emily P. Bissell Hospital, 3000, Newport Gap Pike, Wilmington, 8, Delaware.

Public Appointments

NAVY, ARMY, AND AIR FORCE INSTITUTES. Applications are invited for the part-time appointment (1 session weekly) of OPHTHALMOLOGIST to this Corporation at their London Headquarters. A higher qualification is required and applicants must hold a hospital appointment.

Applications, stating age, nationality, and qualifications, together with the names of 3 referees, should be sent to the Chief Medical Officer, Navy, Army, and Air Force Institutes, Kennington-lane, London, S.E.11, not later than 17th May, 1958.

NAVY, ARMY, AND AIR FORCE INSTITUTES. Applications are invited from general practitioners in the undernoted towns for the appointment in a part-time capacity as MEDICAL OFFICERS to this Corporation. Successful applicants would be required to examine and report on the condition of the employees of the Corporation who may be referred to them from time to time. Fees for this work will be paid on a scale agreed with the British Medical Association.

Applications, giving details of qualifications and experience, should be sent to the Chief Medical Officer, Navy, Army, and Air Force Institutes, Kennington-lane, London, S.E.11, not later than 17th May, 1958.

The towns for which applications are invited are:—

GLOUCESTER	BIRKENHEAD	PEMBROKE
TAUNTON	YEOVIL	MINEHEAD

BUCKINGHAMSHIRE. COUNTY OF BUCKINGHAM-SHIRE, BOROUGH OF HIGH WYCOMBE, AND MARLOW URBAN AND WYCOMBE RURAL DISTRICTS. Applications are invited from registered medical practitioners for the whole-time joint appointment of DEPUTY MEDICAL OFFICER OF HEALTH for the Borough of High Wycombe and the Marlow Urban and Wycombe Rural Districts, AND ASSISTANT COUNTY MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER for the Bucks County Council. Salary within the scale of £1099 12s. 5d.–£1520 3s. 10d. p.a. Travelling and subsistence allowances will be paid on the appropriate scale. The appointment is superannuable, and subject to medical examination.

Further particulars and forms of application may be obtained from the County Medical Officer, County Offices, Aylesbury, to whom applications must be delivered by Monday, 19th May, 1958.

R. E. MILLARD, Clerk of the Bucks County Council.
County Hall, Aylesbury. May, 1958.

BIRMINGHAM. CITY OF BIRMINGHAM. Public Health DEPARTMENT. Applications are invited from registered medical practitioners for post of ADMINISTRATIVE MEDICAL OFFICER OF HEALTH (Male or Female). Candidates should hold the Diploma of Public Health. This is a sectional post and the Medical Officer will be primarily responsible to the Medical Officer of Health for the administration of activities relating to Maternity and Child Welfare Services but will also be available for all other work of the Health Department. Applicants should, therefore, have had extensive experience in maternity and child welfare work and experience in all other branches of public health. Salary scale £2065–£75–£100 (2)–£2340 p.a. Commencing salary within the scale will depend upon the Medical Officer's experience. Pension scheme (including widows and orphans); medical examination. The Officer appointed will be required to devote his/her whole time to official duties and the appointment will be subject to 3 months' notice on either side.

Applications, with names of 3 persons to whom reference may be made, to be sent to the Medical Officer of Health, Council House, Birmingham, 3, not later than 26th May, 1958.

MIDDLESEX COUNTY COUNCIL. Principal Medical OFFICER required. Whole-time appointment on Central Office staff of County Health Department. Duties mainly concerned with administrative and advisory aspects of the personal health services under supervision of the County Medical Officer. Good scope for the exercise of initiative. Salary £1675–£50 (1)–£55 (7) –£2110 p.a. Established, pensionable, subject to medical assessment. Prescribed conditions.

Apply, giving names of up to 3 referees, to County Medical Officer (Ref.: S '), 3, 5, and 7, Old Queen-street, S.W.1, by 24th May (quote X.343L). Canvassing disqualifies.

NORFOLK. COUNTY OF NORFOLK. Assistant County Medical Officer and District Medical Officer of Health. The Norfolk County Council and the County District Councils concerned invite applications from registered medical practitioners holding the Diploma in Public Health for the whole-time appointment of ASSISTANT COUNTY MEDICAL OFFICER AND DISTRICT MEDICAL OFFICER OF HEALTH for Area No. 7 comprising Downham Market Urban District, Downham Rural District and Marshland Rural District, with a total population of approximately 43,000. The person appointed will be employed for 7/11ths of his time as Assistant County Medical Officer and 4/11ths as District Medical Officer of Health. He will act as an Assistant County Medical Officer under the direction of the County Medical Officer and as District Medical Officer of Health he will be subject to the instructions of the District Councils concerned. The combined salary scale will be £1646 rising to a maximum of £1917 p.a. Travelling and subsistence expenses will be paid in accordance with the County Council's scales.

Application forms, together with further particulars of the appointment, can be obtained from the County Medical Officer, 29, Thorpe-road, Norwich, to whom completed application forms should be returned not later than 28th May, 1958.

WARWICKSHIRE COUNTY COUNCIL and BOROUGH OF NUNEATON, BEDWORTH URBAN DISTRICT and ATHERSTONE RURAL DISTRICT. ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH AND DEPUTY MEDICAL OFFICER OF HEALTH. Applications are invited from duly qualified medical practitioners for the post of Assistant County Medical Officer of Health with the Warwickshire County Council, and the successful candidate will also be appointed Deputy Medical Officer for the Borough of Nuneaton, the Bedworth Urban District, and the Atherstone Rural District, which posts together constitute a whole-time appointment, the time being allocated equally between County Council and County District Council duties. The officer appointed must hold the Diploma in Public Health. The aggregate salary will be £1396 5s. p.a., rising to a maximum of £1796 17s. 6d. p.a. Consideration will be given to the granting of financial assistance towards removal expenses.

Conditions of appointment and forms of application may be obtained from the County Medical Officer of Health, Shire Hall, Warwick, by whom completed forms of application must be received not later than 31st May, 1958.

L. EDGAR STEPHENS,
Clerk of the County Council.
A. A. CRABTREE,
Town Clerk, Nuneaton.
S. G. DEEMING,
Clerk of the Bedworth Urban District Council.
G. CARLYON MAY,
Clerk of the Atherstone Rural District Council.

WESTMORLAND COUNTY COUNCIL. Applications are invited for the post of ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER, preferably from medical practitioners holding the D.P.H. or D.C.H. Duties will be in connection with the school health and maternity and child welfare services. Salary in accordance with the Whitley Council scale, at present £1050–£1475, plus travelling expenses. Starting salary according to qualifications and experience.

Application forms obtainable from the County Medical Officer, County Hall, Kendal, to whom they should be returned not later than 19th May, 1958.

GOVERNMENT OF BRUNEI. Medical Officer required for general medical, surgical, obstetric and anaesthetic duties in any hospital in Brunei and for travelling duties in up-river districts if necessary. Candidates must possess qualifications registrable in United Kingdom plus 1 year's post-registration hospital experience. Appointment on contract for 3 years with gratuity (taxable) 12½% of salary payable on satisfactory completion of service; or from National Health Service with retention of superannuation rights plus gratuity (taxable) of 20% of aggregate salary. Salary scale, including inducement pay, £1708–£2564 a year. Starting salary depends on qualifications and experience. Education allowance £140 each child under 18 years, up to 2 in number, if educated outside Borneo. No income-tax. Partly-furnished quarters provided when available at rental of 10% of salary. Free passages for officer, wife, and up to 3 children under 17 years.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/22/03).

GOVERNMENT OF SOMALILAND PROTECTORATE. MEDICAL OFFICER (tuberculosis duties) required to assist in tuberculosis control project which consists of campaign for diagnosis, treatment, tuberculin-testing, B.C.G. vaccination and follow-up of cases. Officer selected must also be prepared to train staff in treatment and prevention of tuberculosis. Candidates must possess medical qualifications registrable in the United Kingdom and have experience in tuberculosis work. Appointment on short-term contract with gratuity (taxable) on satisfactory completion of service. Salary ranges from £1284 to £2115 a year, starting-point determined by experience and qualifications. Furnished quarters at low rental. Free passages in both directions for officer, wife, and up to 3 children under 18 years. No income-tax. Tour of service 18 months, after which generous home leave granted. Local leave also granted.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/5/08).

SOUTH CORK BOARD OF PUBLIC ASSISTANCE. Vacancy for RESIDENT HOUSE SURGEON (registered) at St. Mary's Orthopædic Hospital. Remuneration £502 10s. 6d.

Application forms and particulars may be obtained from the County Manager, Courthouse, Cork, with whom completed applications should be lodged not later than 5 P.M. on Wednesday, 21st May, 1958.

FEDERATION OF RHODESIA AND NYASALAND. FEDERAL MINISTRY OF HEALTH. Vacancy: Director, Research Laboratory, Salisbury. Applications are invited for the post of DIRECTOR, Research Laboratory, Salisbury, Southern Rhodesia, on a fixed salary of £2350 p.a. Applicants should hold a medical or scientific qualification and have experience in entomology, helminthology, or parasitology, both in the laboratory and in the projection of such work into the field. Experience in administering research programmes both in the field and the laboratory will be an advantage. The work of the laboratory is chiefly devoted to the study of malaria and its control and the study of bilharziasis in all its aspects, and the main energies of the staff will have to be devoted to these 2 fields for some time to come.

Application forms and further details from the Secretary (R), Rhodesia House, 429, Strand, London, W.C.2. Closing date 31st May.

GOVERNMENT OF UGANDA. Applications invited from doctors with medical qualifications registrable in the United Kingdom for the following posts :—

MEDICAL OFFICERS for general duties. Successful candidates may be posted to any station in Uganda. During earlier years of service officers will be expected to carry out general medical and surgical duties including a varying amount of public-health administration, school medical work and training of subordinate African medical staff. In most stations, even if remote from larger towns, it is possible to maintain interest in any particular branch of medicine or surgery to which officer is attracted. In most stations work is based on a district hospital which may vary in size from a comparatively small hospital meeting the needs of a backward community to a large hospital with modern facilities where specialisation in the different branches of medicine, surgery and obstetrics is possible. R practitioners, i.e., practitioners liable for call-up under the National Service Acts, may apply to be considered and, if appointed, will be granted indefinite deferment of call-up on completion of a minimum tour of 2 years.

MEDICAL OFFICERS (special grade) for duties in one of the larger hospitals. Candidates must possess either F.R.C.S., F.F.A. R.C.S., M.R.C.P., M.R.C.O.G., or equivalent approved higher qualifications. The selected officers' duties will be primarily in their specialty but they must be prepared to teach students or junior members of the staff and to accept certain general and administrative duties should circumstances require it.

Appointments can be on permanent basis, subject to 2 years' probation, with pension (non-contributory), or on 30–36 months' contract with gratuity (taxable) payable on satisfactory completion of service. Normal retiring age is 55 but at age 45 officers may retire with full pension earned (subject to minimum of 10 years' service). Gratuity for contract service is 13½% of total salary drawn, not including allowances. Candidates from National Health Service may retain superannuation rights up to 6 years and receive gratuity (taxable) of 20% of their salary after engagements. Salary for Medical Officers ranges from £1284 to £2115 a year and Medical Officers (special grade) from £1503 to £2115 a year, starting-points in both scales determined by experience. Other allowances in accordance with current regulations. Permanent officers are eligible to be considered for promotion to superscale posts in Uganda and other territories in medical administration, or, if they possess higher qualifications and suitable experience, in specialist posts. Quarters provided at rental varying from £21 to £78 according to size and type, and hard furniture at a rate of £12 to £24 according to scale. Free air passages for each journey are provided up to equivalent of 4 adult tourist class air fares for officer, wife, and dependent children. If, in the interest of Government an officer is required to proceed on leave after a short tour of 15 to 18 months, there is no limit to the number of family passages. Taxation at East African rates, generous home leave granted after each tour in addition to which casual local leave is allowed at the rate of 16 days per annum. Primary educational facilities available in all the larger stations. Education subsidies are payable to officers, which vary from £90 a year (or half the school fees, whichever is less), for primary education for first child, to £140 a year (or three-fifths of school fees, whichever is less) for secondary education for each of second and subsequent children.

Application forms obtainable from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/9/02).

HER MAJESTY'S OVERSEAS CIVIL SERVICE. Medical OFFICER required in North Borneo for general clinical work in tropical and other diseases, maternity and child welfare, promotion of public and rural health and sanitation, with limited administrative duties. Must be prepared, if necessary, to perform emergency surgery, attend midwifery cases, and travel to outlying places (in district to which posted). Candidates should possess qualifications registrable in United Kingdom and have had at least 1 year's postgraduate hospital experience; D.T.M. & H. desirable but not essential. Appointment on permanent basis with pension (non-contributory) 1/600th of final pensionable emoluments for each completed month of pensionable service. Salary scale, including inducement pay, £1470–£2324 p.a. In addition, married officers with 1 or more dependent children under 18 years receive allowance of 7½% of salary with a maximum of £140 a year, and an education allowance of £140 a year for each of up to 2 children between 5 and 18 years educated outside North Borneo. Quarters provided when available at low rental, or hotel allowance payable in lieu. Free passages for officer, wife, and up to 3 children under 18 years of age. Generous leave. Income-tax at local rates.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/21/04).

General Practice

For an **Executive Council post** *(England and Wales) apply on form* **E.C.16A** *obtainable from the council. Mark envelope "Vacancy."*

BRISTOL EXECUTIVE COUNCIL. Applications invited to fill a General Medical Practice VACANCY which will arise on 5th July, 1958, in the Bedminster District of Bristol (Urban). List at present approximately 1378. Practice vacated by a woman practitioner. Residence including surgery available for purchase, also, if required, branch surgery (top portion of which is now occupied by caretaker). Apply before 17th May, 1958, on Form E.C.16A, obtainable on application from the Clerk, Bristol Executive Council, 5, Alexandra-road, Bristol, 8. Please mark envelope "A."

BRISTOL EXECUTIVE COUNCIL. Applications invited to fill a General Medical Practice VACANCY which will arise on 5th July, 1958, in the Bedminster District of Bristol (Urban). List at present approximately 1460. Residence and surgery available for purchase. Apply before 17th May, 1958, on Form E.C.16A, obtainable on application from the Clerk, Bristol Executive Council, 5, Alexandra-road, Bristol, 8. Please mark envelope "B."

BRISTOL EXECUTIVE COUNCIL. Applications invited to fill a General Medical Practice VACANCY in the Knowle District of Bristol occasioned by the death of a general medical practitioner. List approximately 1441. Urban. Surgery accommodation available. Apply before 17th May, 1958, on Form E.C.16A, obtainable on application from the Clerk, Bristol Executive Council, 5, Alexandra-road, Bristol, 8. Please mark envelope "C."

CARDIGAN AND DISTRICT. Applications are invited for VACANCY, due to death. Rural. List at present approximately 1124. Surgery accommodation may be available. Apply on E.C.16A before 19th May, 1958, to—

B. HUTCHINGS, Cardiganshire Executive Council.
Swyddfa'r Sir, Aberystwyth.

Required, Trainee Assistant rural group practice. Cottage Hospital.—Apply, Surgery, Alford, Lincs.

Miscellaneous

Old-established pharmaceutical firm wishes to supplement advisory panel. Applications are invited from Clinicians (Registrar grade and above) willing to undertake assessment of new drugs by clinical trials. Grants will be made for this work and expenses and supplies will be provided.—Address, No. 397, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Australia, Queensland. The Associated Friendly Societies. Medical Officer required for Bundaberg. Salary £A1250 p.a. plus free residence and services. Private practice allowed, estimated £A1500. Fare paid.—Full particulars obtainable from Agent-General for Queensland, 409, Strand, London, W.C.2.

Sudan. British (Male) doctor required about August for Nursing Home which employs British Matron and British Nursing Sisters and serves British residents. Tropical experience preferred. Age under 50. Free furnished house, annual home leave with free air passages, including family. Salary £S.2500 (a Sudanese £ is equivalent to £1 0s. 6d.). There is no income-tax in the Sudan at present. Possibility of private practice.—Apply Airmail, The Hon. Secretary, Harper Nursing Association, P.O. Box 97, Khartoum, Sudan, Africa.

THE BAHRAIN PETROLEUM COMPANY LIMITED has a vacancy for a LABORATORY TECHNICIAN (Female) in their Hospital at Bahrain, Persian Gulf. Candidates should possess Final I.M.L.T. and have had experience in bacteriological, hæmatological (including Rh. blood grouping) and biochemical investigations. Commencing basic salary £68 per month. In addition a living allowance is paid together with free air-conditioned quarters, initial kit allowance plus paid leaves, pension and provident fund benefits, &c.

Please apply in writing with full particulars to Caltex Services, Ltd., Caltex House, Knightsbridge Green, London, S.W.1.

Assistant required. Varied work to 2 partners. No view. Furnished accommodation provided suitable 1 child only. Industrial Birmingham. Salary by arrangement.—Address, No. 395, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

For Sale by Private Treaty.—Norbury Hall, 5 miles south of Ashbourne, Derbyshire. Large country house built 1875; modernised and maintained in first-class order; 25 bedrooms; 6 bathrooms; central heating; mains electricity; 20 acres grounds. Very suitable for adaption as school, nursing home, &c. Vacant Possession end 1958. Price £15,000 or near offer.

Further particulars from JOSHUA BURY EARLE & Co., Chartered Land Agents, 7, Brazennose-street, Manchester, 2.

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 98, Victoria-street, S.W.1 (VIC. 0141), who are specialists.

Microscopes. Highest prices paid for good modern types. Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

1 Cambridge Standard Electrocardiograph for sale. Well maintained, good condition. Purchased 1948.—Apply House Governor, The Guest Hospital, Dudley, Worcestershire.

Part-time Consulting Rooms to be Let in Harley-street. Rents from £50 per half-day session. Apply: ELLIOTT, SON AND BOYTON, 86/87, Wimpole-street, London, W.1. WEL. 8367.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimens of urine and £2 2s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Young lady requires post as secretary/receptionist to doctor in Manchester or Stockport area.—Address No. 396, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

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J. Amer. med. Ass., 1956, **162,** 1381.

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HYPERTENSION

Since it was first isolated in CIBA Research Laboratories Serpasil has been used all over the world. Patients of every colour and race have taken Serpasil and benefited from its unique actions. Serpasil is used as the basic treatment in hypertension. Many patients with mild or moderate symptoms need no other treatment. In more severe hypertension Ecolid or Apresoline may be used in combination with Serpasil.

Tablets of 0.25 mg. in bottles of 25, 100 and 500. Elixir containing 0.05 mg./c.cm. in bottles of 100 c.cm., 0.1 mg., 1 mg. and 4 mg. tablets and 1 mg. and 2.5 mg. ampoules also available.

A 55-page booklet giving historical facts on hypertension, a review of modern treatment and details of CIBA antihypertensives, is available on request.

CIBA

'Ecolid', 'Apresoline' and 'Serpasil' are registered trade marks. Regd. user

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